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The BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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DEPARTMENTS

The Earth
Stories and Legends
All Countries
Golden Deeds
Helps to Learning
Literature
Animal Life
Famous Books
Dominion of Canada
The United States
Familiar Things
Our Own Life
The Fine Arts
Men and Women
Poetry and Rhymes
Plant Life
Things to Make
and Things to Do
Book of Wonder

VOLUME VII

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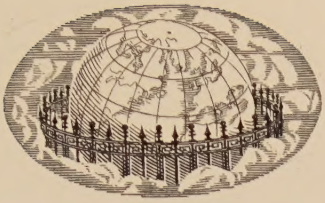

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This is a short guide to the principal contents of this volume. It is not possible to give all of the questions in The Book of Wonder, or the titles of all of the Little Verses and Problems, but in all cases the pages are given where such sections of the book begin. In the big Index, Volume 20, you will find every title and every subject, including the pictures.

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Photo, Kadel & Herbert.

Crater Lake west of Wizard Island, Crater Lake National Park.

UNITED STATES NATIONAL PARKS

CONTINUED FROM 2095

THE national parks of the United States are tracts of land set apart by Congress for the use and enjoyment of the people for all time. It may be beauty of scenery, it may be some wonder of nature, or it may be some health-giving quality that is responsible for the creation of a national park. We think of Central Park in New York or Lincoln Park in Chicago as parks, but a national park is a quite different thing. It is not a small block of land with trimmed paths and smooth lawns: it is a large area made beautiful by nature and left so by man.

There are nineteen national parks in the United States and its territories, and of these twelve are magnificent in size and scenery. Each of them has its own marvel to draw wondering eyes, but the greatest of them is the Yellowstone National Park, in northwestern Wyoming. Because of its size and its many marvels this park has been given an article of its own in The Book of Knowledge. On page 729 this park is described in words and pictures.

Glacier National Park, with its 1,534 square miles of mountain and valley, in northwestern Montana, is the second largest national park in continental United States. It was given its name because in the hollow of its mountain-tops lie more than sixty small glaciers. It is a richly colored land of rugged mountains, enormous twisting glacier-scooped valleys, precipices thousands of feet high, rushing streams and romantic lakes. Glacier Park, which runs along the Canadian boundary, was discovered in 1853, and was explored in 1861, when engineers went in to survey the boundary line.

California is the fortunate state that possesses Yosemite National Park, third in area of the national pleasure lands. The Yosemite lies west of the crest of the Sierra Nevada Mountains. The most familiar section of this park is the Yosemite Valley, which is a mere crack seven or eight miles long and less than a mile wide, but it is a crack of extraordinary character and startling beauty. Thousands and thousands of years ago there was no valley. During the course of uncountable ages the Merced River, which originally flowed at the level of the present canyon top, cut through thousands of feet of solid granite. Over

the sheer precipices that rise from the floor of the valley the tributaries of the Merced tumble as giant waterfalls. The king of these falls is the Ribbon Fall, with a straight drop of 1,621 feet. Lesser monarchs are: the Yosemite Falls, Lower Yosemite Fall, Vernal Fall, Illilouette Fall and Bridalveil Fall. The falls are at their best in May and June, when the winter snows are melting.

There are many other magnificent sights in Yosemite Park. The Tuolumne River dashes in a mad rush through the Hetch Hetchy valley, producing the Waterwheel Falls. The monster mountain mass, of which Mount Lyell is the chief, lies on the southwest boundary of the park. In the extreme south is the Mariposa Grove, with its giant sequoia trees. Mirror Lake is famous for its reflection of the surrounding cliffs.

In the words of John Muir, explorer, geologist and writer, the park includes the headwaters of the Tuolumne and Merced rivers, two of the most songful streams in the world; innumerable lakes and waterfalls and smooth, silky lawns; the noblest forests, the loftiest granite domes, the deepest ice-sculptured canyons, the brightest crystalline pavements, and snowy mountains soaring into the sky twelve and thirteen thousand feet, arrayed in open ranks and spiry pinnacled groups partially separated by tremendous canyons and amphitheatres; gardens on their sunny brows, avalanches thundering down their long white slopes, cataracts roaring gray and foaming in the crooked rugged gorges, and glaciers in their shadowy recesses working in silence, slowly completing their sculptures; newborn lakes at their feet, blue and green, free or encumbered with drifting icebergs like miniature Arctic Oceans, shining, sparkling, calm as stars.

Sequoia National Park in California is noted for possessing the largest trees in the world—the sequoias. Our photograph shows the trees known as the Three Sisters, which are beside the road to Moro Lake.
Photo, Ewing Galloway.

"THE GRAND CANYON OF ARIZONA FILLS ME WITH AWE!"

"It is beyond comparison — beyond description — absolutely unparalleled throughout the wide world!" Such was Theodore Roosevelt's opinion of the National Park in north central Arizona. Here is found the colossus of canyons. Words can describe feebly this masterpiece of time and wind and water. Of its kind nothing in the world approaches it in size, form and glowing color; it is the greatest known example of erosion. A person standing on the edge of the canyon overlooks a thousand square miles of gigantic natural pyramids and pinnacles carved by the forces of nature. Winding along, a mile below the rim, is a shining silver thread — the Colorado River. The first glimpse of this great crack in the earth's surface is a revelation and strikes awe into the heart. It seems as if a mighty hand had dug into the earth and rock; it is so magnificent that it does not seem real. The mind is dazed with its wonder and grandeur. To add to the solemnity of the scene, the silence of death seems to reign on the canyon's edge, for this is one of the stillest places on earth. Sound does not carry, and not an echo mounts from the stream below —the roaring, rushing Colorado River.

Don Lopez de Cardenos, a Spanish adventurer, discovered the Grand Canyon in 1540, as a result of stories told by the Hopi Indians. Two hundred and thirty-six years later two Spanish priests mention the canyon. The first American to visit this great wonder was a trapper, James O. Pattie, who hunted beaver on

CROWNED BY EVERLASTING SNOW

Mount Rainier, in the National Park of that name, was once a flaming volcano, but now it is an ice-crowned peak towering 14,408 feet above tidewater in Puget Sound.

This is the picturesque Grinnell Lake in Glacier National Park. To the left is Gould Mountain, and to the right Grinnell Mountain. This region is a favorite haunt of Rocky Mountain goats.

Photos, Kadel & Herbert.

LOOKING DOWN FROM A STONE A MILE HIGH

In this picture of the Yosemite Valley we see a striking example of the wonders of Nature. The valley lying between these immense cliffs was probably cut out by glaciers, or rivers of ice. It is seven miles long, and from it rise huge cliffs, some of them nearly 5,000 feet high. The sides of most of these cliffs are not only very high, but as straight and smooth as the sides of a tower. Sometimes they have landings jutting out at great heights, from which venturesome travelers look into the depths about a mile below, or out across 100 miles of space. This great valley in California has some of the finest scenery in the world, including famous waterfalls, like Yosemite Falls, and other wonders.

By De Cou, © Ewing Galloway, N. Y.

the Lower Colorado in 1825. Other explorers came and went, but it was not until 1869 that Major John Wesley Powell, a one-armed veteran of the Civil War, and a small party made a trip down the Colorado River itself, the water rushing between the narrow rocky walls producing violent cataracts with huge waves and a speed of over twenty miles an hour. The Grand Canyon is the deepest and widest of the long series of canyons through which the Colorado flows for five hundred miles across high table-lands.

The rain falling in the plowed field forms rivulets in the furrows. The rivulets unite in a muddy torrent in the roadside gutter. With succeeding showers the gutter wears an ever deepening channel in the soft soil. With the passing season the gutter becomes a gully. Here and there, in places, its banks are undermined and fall in. Here and there the rivulets from the field wear tiny tributary gullies. Between the breaks in the banks and the tributaries irregular masses of earth remain standing, sometimes resembling mimic cliffs, sometimes washed and worn into mimic peaks and spires.

Such roadside erosion is familiar to us all. But seldom, perhaps, have we realized that the muddy roadside ditch and the world-famous Grand Canyon of the Colorado are, from Nature's standpoint, identical; that they differ only in soil and size. If we do realize it, it is much easier to appreciate and understand this spectacle of Colorado. There are several trails from the rim down to the river. Along any of these the strata of rock of different ages can be seen in the canyon walls. Two of the most celebrated trails are the Bright Angel and the Hermit. Grand View and Desert View are spots on the rim where glorious views of the wildly colored canyon may be obtained. Ribbon Fall, Phantom Ranch, Marble Canyon, Indian Garden, the lower plateau, or Tonto Platform, are just a few of the many glimpses of glory that the Colorado Canyon National Park has reason to be proud of. But to attempt to describe them would be impossible—words would fail.

Photo, courtesy National Park Service, Department of the Interior.

Lafayette National Park, on Mount Desert Island, Maine, is the only national park in the East. It has varied beauty of seacoast, mountain and forest.

The four parks we have mentioned are far and away the largest in size of those actually inside the borders of the United States. But in Alaska there is a park which is second in size only to the Yellowstone—the Mount McKinley National Park, with an area of 2,200 square miles. The highest mountain in North America, Mount McKinley, rises 20,300 feet above its brother peaks in the Alaska Range, and reigns over this northern land. This lofty snowclad king rises from a rolling plateau, treeless but rich in moss and grasses, and gives its name to the whole park. Mount McKinley has two heads, South Peak and North Peak. From

Photo, Reclamation Service; courtesy National Park Service, Department of the Interior.

El Gobernador, or the Sphinx, in Zion National Park, is a gigantic dome of rock with its top sliced off. The lower part of the rock is red, and the upper part white.

Photo, courtesy Denver Tourist Bureau.

Cliff Palace is one of the astonishing spectacles to be seen in Mesa Verde National Park. In prehistoric times a race long since vanished lived in the two hundred rooms which make up the village or palace.

WHERE IMPRESSIVE GRANDEUR OVERWHELMS THE ONLOOKER

Photo, Kadel & Herbert.

Chasm Lake, in Rocky Mountain National Park, is one of the wildest lakes in nature. It is frozen for eleven months of the year.

Photo, courtesy National Park Service, Department of the Interior.

Down at the bottom of the Grand Canyon, in the Grand Canyon National Park, our photograph shows the madly rushing Colorado River.

these peaks long ridges spread out, and between the ridges on the southern and eastern slopes are great glaciers, but to the north and west precipices drop to grassy valleys.

This national park was created to protect the wild creatures of Alaska. When the government railroad was opened to Fairbanks there was a danger that hunters would destroy the caribou and mountain sheep, but the park has saved these animals as well as the moose and deer.

ROCKY MOUNTAIN NATIONAL PARK WITH ITS LAKES

All the other national parks are under 400 square miles each, and indeed three of them are under two square miles in area. But each has its own attraction and beauty and charm. For lovers of rugged snow-capped mountains there is the Rocky Mountain National Park, in Colorado. These mountains are part of the Continental Divide, the name given to the height of land running from north to south and dividing the waters flowing eastward and those flowing westward.

The beautiful village called Estes Park forms the eastern entrance, while Grand Lake is the western gateway. The most prominent feature of Rocky Mountain Park is Longs Peak, which rises to a height of 14,255 feet above sea-level. Its square-cornered head was unclimbable for many years; then an opening called the Keyhole was found along one of the sides. The east of Longs Peak is a steep precipice sheering almost 2,000 feet down to Chasm Lake. This lake, which is frozen during eleven months of the year, is one of the wildest spots in the Rockies. It is in this region of the United States that glaciers and their work can be studied to best advantage.

MOUNT RAINIER PARK IS AROUND A DEAD VOLCANO

Going from the Colorado Park to the northwest, one reaches Mount Rainier National Park. It is hard to believe that once upon a time this green and smiling land quaked around a lava-spouting mountain; but it is so, for Mount Rainier, now helmeted in ice, was an active volcano at one stage of the world's history. This mountain giant has changed from a fiery waking state to a cold silent sleep. But it is as beautiful when asleep as it was when awake, for its silver-armored peak shines over 14,000 feet above the level of Puget Sound and can be seen 150 miles out in the Pacific. From the summit and sides of Mount Rainier a perfect glacier system stretches out to form the headwaters of twenty-eight named rivers of ice and many unnamed. There are 48 square miles of glaciers, ranging in width from 500 feet to a mile, and in thickness from 50 to more than 1,000 feet. The Nisqually Glacier is the best known; it is five miles long, and at Paradise Valley is half a mile wide.

It is not for its glaciers alone that this park is noted. The lovely wild-flower fields share in the admiration of everyone who goes to Mount Rainier National Park. It is of these that John Muir says:

> Above the forests there is a zone of the loveliest flowers, fifty miles in circuit and nearly two miles wide, so closely planted and luxuriant that it seems as if Nature, glad to make an open space between woods so dense and ice so deep, were economizing the precious ground and trying to see how many of her darlings she can get together in one mountain wreath—daisies, anemones, geraniums, columbine, erythroniums, larkspurs, etc., among which we wade knee-deep and waist-deep, the bright corollas in myriads touching petal to petal. Altogether this is the richest subalpine garden I have ever found, a perfect floral Elysium.

LASSEN PARK CONTAINS THE ONLY LIVE VOLCANO

From realms of snow to realms of fire is a gigantic leap, but that leap is taken when Lassen Volcanic National Park is visited. We have seen mountain kings in robes of clouds seated upon thrones of rocks; age-old ice crowned them, and they were full of cold, distant majesty. They were impressive, and awe came upon all who saw those monarchs. But in Lassen Park is a mountain sovereign of another kind—a royalty that breathes smoke and steam and pours out molten lava. Lassen Peak is the only active volcano within the borders of the United States proper. It is in northern California, at the southern end of the Cascade Range. In May, 1914, after a quiet of two hundred years, an explosion took place from its summit and a period of eruption began; between that date and January, 1916, 220 similar explosions occurred. The blasts of tremendously heated gas withered every living thing within ten miles, burned up forests, and flooded the valleys with rushing

Lassen Peak is the only active volcano within the borders of continental United States, and for that reason Congress has set apart the land around it as Lassen Volcanic National Park. This park is in northern California at the southern end of the Cascade Range. Lassen Peak, which had been quiet for two hundred years, began to erupt again in 1914. Photo, courtesy Air Service, U. S. Army.

Mount McKinley, in Mount McKinley National Park, Alaska, is the highest mountain in North America. This snow-clad peak rises 20,300 feet above sea-level. Enormous glaciers clothe its sides. Rolling plateaus spread out from its base. On these plateaus roam herds of caribou and flocks of mountain sheep.

rivers from the melting snow-fields. In Lassen Park one finds a charm in the vivid contrast between the lower forests and ice-cold lakes and the volcano with its lava, hot springs and crater.

CRATER LAKE IN THE CONE OF ANOTHER VOLCANO

Two hundred miles south, in the state of Oregon, is another park—Crater Lake National Park, which owes its being to one of Mount Rainier's brother volcanoes. Thousands of years ago Mount Mazama rose up in a fiery cone, but through some strange natural convulsion under the earth's crust the whole upper part of the mountain fell into the interior of the earth. During the course of many centuries the huge hole which was left was filled up with water from many springs, until a lake of great depth was formed. This is the present Crater Lake of unbelievably blue water, the liquid jewel of Oregon, set in a sculptured gray lava rim.

There is a curious lava island not far from the shore—the Phantom Ship it is called, because at a distance it seems like a ship under sail. In the gloaming or in the moonlight the result is startling. Equally surprising is the disappearance of this ghostly ship, for in certain slants of light the phantom disappears.

THE GREAT VOLCANOES IN THE HAWAIIAN ISLANDS

Under the American flag, in the Hawaiian Islands, there is a national park which is a land of coral reefs, tropical palms and flowers, pineapples, and earthquakes and volcanoes. It was the extraordinary trio of volcanic peaks that led Congress to create a national park here in 1916. Haleakala, on the island of Maui, and Mauna Loa and Kilauea, on the island of Hawaii, are world-known. Haleakala means, "the House of the Sun," and it has a crater 7½ miles long and 2 1/3 miles wide. But it is a dead volcano, and its broad sandy floor is covered with "silver sword" plants. Those who reach the crater rim at sunset sometimes have the curious experience of seeing their shadows thrown upon the rising mists, where they are encircled with a rainbow frame. It is the island of Hawaii that harbors Mauna Loa, the greatest of living volcanoes, and Kilauea, with its lake of fire. These are competitors for volcanic honors, although the former is 13,675 feet high and the latter is only 4,000 feet. The difference between them is that Mauna Loa erupts as a proper volcano should do, while Kilauea is content to keep its lava boiling in a pot which is called "Halemaumau," which means, "the House of Everlasting Fire." The walls of this pit are hundreds of feet high, but a venturesome person can descend the sides and approach surprisingly close to the flaming surface.

WHERE WE MAY STUDY A PREHISTORIC CIVILIZATION

Mesa Verde National Park, in southwestern Colorado, is interesting for quite the opposite reason to most of the national parks. So far we have been admiring Nature's handiwork, but in Mesa Verde the interest lies in the remains of a prehistoric civilization. Here are found cliff-dwellings in their highest development in the United States.

Mesa means "table" and Verde means "green," so it needs little imagination to guess that this park is a plateau with vegetation. Mesa Verde is one of the large mesas; it is fifteen miles long and eight miles wide and stands on the right bank of the Mancos River, down to which a number of small rough canyons slope from the top of the mesa. In the sides of these canyons the wonderful cliff-dwellings were discovered in 1888 by Richard and Alfred Wetherill. Two of the villages of the cliff-dwellers are in excellent condition. One—Cliff Palace—has 200 living-rooms and 22 sacred rooms for worship. Another—Spruce-tree House—could shelter 350 people. Tools and weapons of stone, brightly patterned sandals, attractive baskets and decorated jars have been found in the rooms, and show the culture of the cliff-dwellers. Centuries before white men saw America the Pueblo villagers had their own civilization.

BIG TREES AND BRILLIANT ROCKS DEMAND MENTION

Sequoia National Park and General Grant National Park, in middle eastern California, owe their fame to the sequoia trees. Here are found the largest and oldest trees in the world. In the two parks there are more than a million sequoia trees, of which 12,000 are more then ten feet in diameter. The greatest single tree, the General Sherman Tree, has a diameter of 36.5 feet and a height of 279.9 feet. Two parallel street-

car lines and a driveway might be run through the trunks of several of the largest trees. John Muir counted the rings on the stump of an old tree and found that there were four thousand. Four thousand years that leafy giant had lived before it crashed to the earth!

A peacock among the parks is the Zion National Park, part of the desert of southern Utah. The brilliant red precipice, the Vermilion Cliff, joins the glistening White Cliff and creeps under it. Sandstones and shales of many colors dazzle the eye like a Roman scarf. The first European settlement in America north of the Gulf of Mexico was here. This park was the gift of public-spirited citizens to the nation. It was named Lafayette, in honor of the great Frenchman.

Four of the nineteen national parks remain to be mentioned. Hot Springs Reservation, in the Ozark Mountains of Arkansas, has curative hot springs. This is the oldest national park, as it was made such in 1832. The motive was to keep the springs, with their wonderful power, in the possession of the people. This spot was known to the Indians

© De Cou, from Ewing Galloway.

Halemaumau, fire pit of the volcano Kilauea, Hawaii.

Western and Eastern Temples are two gigantic stone masses which seem to form the gateposts to the canyon which comprises the park. The Streaked Wall, the Brown Wall, the Sentinels, the Three Patriarchs and El Gobernador, the colossal truncated dome, are riots of color. Zion Park is very gorgeous and quite unlike its brothers.

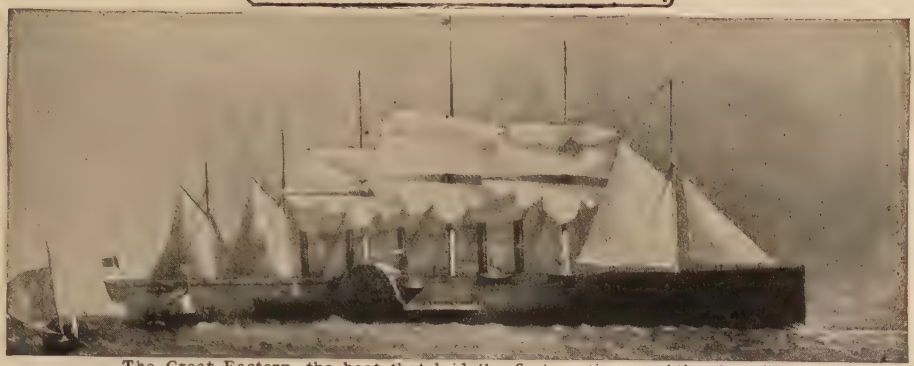
SOME OF THE SMALLER PARKS FINISH THE LIST

The only national park in the East is an area of eight square miles on Mount Desert Island, Maine. Mountain, forest and sea make up this beautiful haven where Champlain landed in 1604. The long before the Spaniards knew of America. Platt National Park, in southern Oklahoma, is noted for its sulphur and other mineral springs. Wind Cave, a remarkable limestone cavern in the Black Hills of South Dakota, was made a national park in 1902. Its name was given because a current of air passes in and out of its mouth at intervals. This park is used also as a game preserve for bison, elk and antelope. Another wild-animal sanctuary is found in North Dakota and goes by the name of Sully's Hill National Park. It is a rugged bit of forest and has historical associations.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 2427.

THE BEGINNING OF THE LONGEST REIGN

This picture represents the beginning of the longest and most prosperous reign in the history of England—the reign of Queen Victoria. When King William died at Windsor, in 1837, two mounted messengers rode through the night to Kensington Palace. They found Princess Victoria asleep, and this girl of eighteen was awakened about five o'clock in the morning to be told that she was queen of England. This picture, painted by H. T. Wells, R.A., and now hanging in the Tate Gallery, London, shews the young queen at this great moment of her life. She reigned for over sixty years and died 1901. By permission of the Fine Art Society, the owners of the copyright.



The Great Eastern, the boat that laid the first continuous Atlantic cable.

THE WONDERFUL CENTURY

CONTINUED FROM 2212

PEACE was made by the great powers at Vienna in 1815 and the map of Europe rearranged. For some years all countries went through a difficult time of paying their war debts and reestablishing their soldiers in civil life. In 1820 George III died and was succeeded by his son George IV, who had long been acting as regent. Hardly anyone minded when this unpopular king died in 1830. His brother William IV was often called the "sailor king." After his short reign of seven years the throne fell to a young girl, Princess Victoria. "Who will be king, Mamma," she said when she was twelve years old, "when Uncle William dies?" "You will be queen, my dear." "Then I must be a very good little girl now." This feeling of responsibility toward her people was the keynote of the long reign of Queen Victoria, and lifted the crown into a position that it had not occupied since the days of Good Queen Bess.

Though Great Britain was often at war on the confines of her world-wide empire during the century, none of her wars was so great as to affect seriously the daily life of her people, and so her story is about popular progress and improving conditions for ordinary living and expanding education.

Three decades are distinguished by great movements of vast importance. In the Thirties came the first victory for the reform of the system of electing members of Parliament. In the Forties the battle for cheap food was won, and the tax on imported corn was removed, an ending which brought lasting honor to the name of Sir Robert Peel. In the Sixties the cause for national education was won, and the Education Act of 1870 was passed. Gradually education was made free and compulsory for all. Only so could power to vote be safely given to all the people.

The nineteenth century, without a doubt, was the brightest in the country's history. It had its black patches, but in it Great Britain rose to a greater and more honorable position in the world than she had ever attained before.

WHAT WE MEAN BY THE INDUSTRIAL REVOLUTION

The century began in the midst of the period when England was changing from being chiefly agricultural to being chiefly manufacturing; from the time when her people lived mostly in villages to the time when they lived mostly in towns. One of the reasons for the change was that the rapid invention and development of machinery which later was worked by steam helped manufacturers to produce large quantities of material more quickly and cheaply than they could

be produced by hand in the villages. So things were made in factories in towns, and there men moved from the villages following the chance of work.

Another reason was that the wars that went on for twenty years against the French made it necessary that the British Isles should feed their people with home-grown wheat, both by sowing the crop on more land and by farming the land in such a way that each acre and animal would yield more food.

The use of more land for corn-growing was brought about through enclosing village commons. These enclosed lands were added generally to large estates, and the poorer people lost many privileges in consequence, for before that time any animals they owned could have free grazing on the commons. In 145 years 4,000 Enclosure Acts were passed, and five million acres were taken from the people. Many of these enclosures took place shortly before and shortly after the beginning of the nineteenth century.

This was useful for a time, for it helped to feed the nation in war time, and the large owners studied breeding and better methods of production, so that the yield from the land was increased. But later on it cut off the laborer from any claim on the soil of his country and drove him into the towns to find work.

THE MISTAKE THAT WAS NOT PUT RIGHT FOR A HUNDRED YEARS

No one can understand the darker side of the nineteenth century in England who does not realize how the workers on the land were largely turned adrift by Enclosure Acts, and how the workers in manufacturing were turned adrift by the use of machinery in nearly every trade. The result was that many were out of work and their competition with each other brought prices for all kinds of labor very low.

Behind both these evils, in agriculture and in manufacturing, was a mistake that was not corrected for quite a century. In 1776 a clever Scotsman, Adam Smith, published a book on The Wealth of Nations, a fine study of the natural laws which govern the making of wealth, and which cannot be neglected without danger. It was long regarded as a kind of gospel of economy, and indeed it is so if it is rightly understood; but the men who read and accepted the book overlooked the fact that it treated the wealth of a nation as a whole. It told how a nation might become wealthy, but it did not tell how the wealth made should be fairly shared, and so England became enormously wealthy as a whole, while large numbers of people who did most necessary work in producing the wealth were wretchedly poor.

WAS ENGLAND EVER SO UNHAPPY AS IN THE NINETEENTH CENTURY?

One part of the story of the nineteenth century is the struggle to insure that a reasonable share of the great total of wealth shall reach all who have helped to win it. The black patches in the century are the times when poverty has beclouded the lives of whole sections of the workers, as it did in the Twenties and Thirties, when nearly all the farm laborers were paupers, and when women and little children, as well as men, worked long hours in factories for small wages. It is doubtful whether England was ever so unhappy as then.

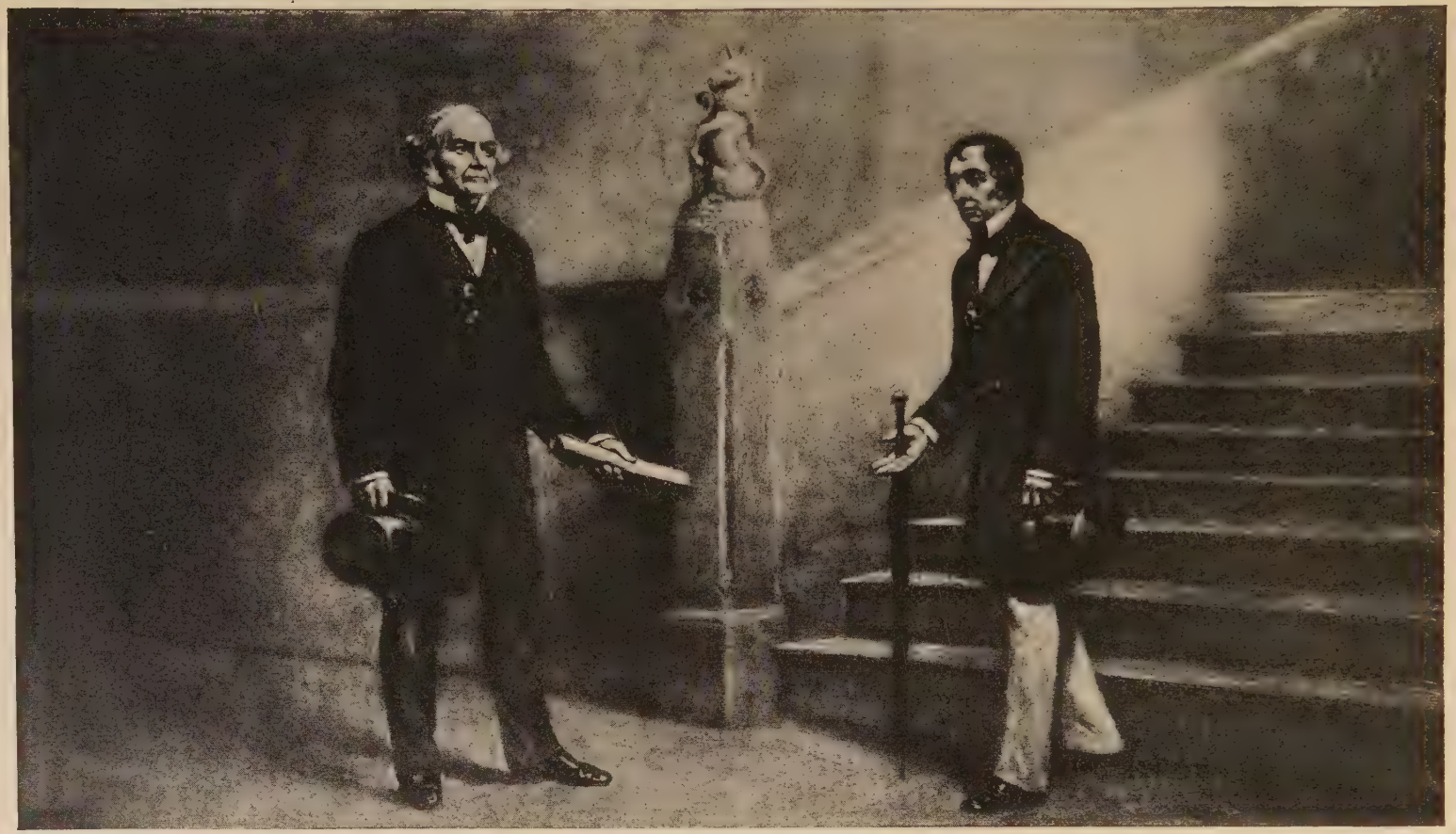
Why, then, you will ask, can this century be called a modern golden age? The answer is that gradually these evils were checked, and in the sharing of wealth the century saw changes made for the better, through victories won by the two guardian angels of nineteenth-century Britain—freedom and humanity.

At the beginning of the century it was illegal for men to agree together to sell their labor only at a certain price. Trade-unions were not allowed till a quarter of the century had passed; and in 1834 men were sentenced to transportation for forming an agricultural laborers' union. But gradually it dawned upon the mind and heart of the nation that men and women could not be treated by bargaining in a cold, mechanical way, as if they were mere goods and chattels.

THE STIRRING OF A FEELING OF COMMON HUMANITY

The nation as a whole must protect by its laws those who were doing its work, and afford them the decencies of life and health. So new Poor Laws were passed; humaner conditions were insisted on in factories, workshops and mines; dangers to life were reduced; working hours were shortened; child labor was lessened by limits of age, and it was made clear that liberty does not include the power to make slaves of human beings.

TWO OF ENGLAND'S GREATEST STATESMEN



GLADSTONE AND DISRAELI

No small part of the freeing of the workers from the evils brought about by the Enclosure Acts, and the transformation of England into an industrial nation, was due to sensitiveness aroused by suffering at home and abroad.

The feeling against slavery abroad, followed by its complete abolition in British territory at a cost of twenty million pounds; the exposure of the evils of prison life, first by John Howard and later by Elizabeth Fry; the campaign by Sir Samuel Romilly against the excessive punishments inflicted according to the laws, which aimed at terrorizing people into good behavior—all these things worked together to create a feeling of public duty toward everybody.

If men who were engrossed in the science of business were too apt to think of the creation of national wealth as a whole, without troubling about the sharing of it, others were keenly alive to the need for a wise and tender care for the nation as a whole. Thus, for example, there was a long struggle for health and education for all. Whatever these blessings and opportunities cost, it was felt the nation could not afford to be without them.

THE GREAT POEMS THAT EXPRESSED THE FEELING OF THE TIME

Before leaving the idea of the nation's widening sense of humanity—which is the care by all for the wants of each—and before we follow more clearly through the century the growth of freedom, we may notice how fully this spirit of humanity was expressed in the writings of the time.

Not only have we, as signs of the times, such poems as Ebenezer Elliott's God Save the People, Mrs. Browning's Cry of the Children, and Tom Hood's Song of the Shirt; but in the stories of Charles Dickens we have the all-pervading interest of man in man. Common life and everyday character are presented as a sufficient attraction, amusing, lovable, hateful, but all-important. Dickens wrote from the midst of an age intense in its humanity, and the most lasting fiction of the whole century has the same feature. Plot and fashion and sentiment fade away, but character and humanity remain.

Although there was an unequal sharing of the wealth acquired by the country, the growth of England's wealth, looked at as a whole, was enormous. For twenty years Europe was overrun by battling armies, but all the while Britain was free, and, aided by invention and the power of machinery, she was making herself the workshop of the world.

She took to herself the freedom of the seas and used it to sell her wares in every land. When Napoleon ordered Europe to boycott her goods they were smuggled in, for the patrolling of the seas was in her hands. And after Napoleon was overthrown the lead was held by her in manufactures, commerce, shipping and all extensions of business enterprise.

NEW WAYS OF INCREASING WEALTH AND NEW WAYS OF GETTING ABOUT

All through the century, though in later years rivalry arose in many branches with Germany and America, there was a constant expansion of prosperity, with London as the heart of the world's financial dealings. Free from the drawback of great wars for a hundred years, the country was better off than it realized.

It is remarkable how the new ways of increasing wealth by swiftness and cheapness in manufacture and in movement began in Great Britain. Spinning and weaving machinery, and the use of steam for power, belong to the later eighteenth century, but the use of steam for locomotives and the covering of the country with a network of railways was chiefly the work of the north-country Stephensons, father and son, and spread rapidly from England all over the world.

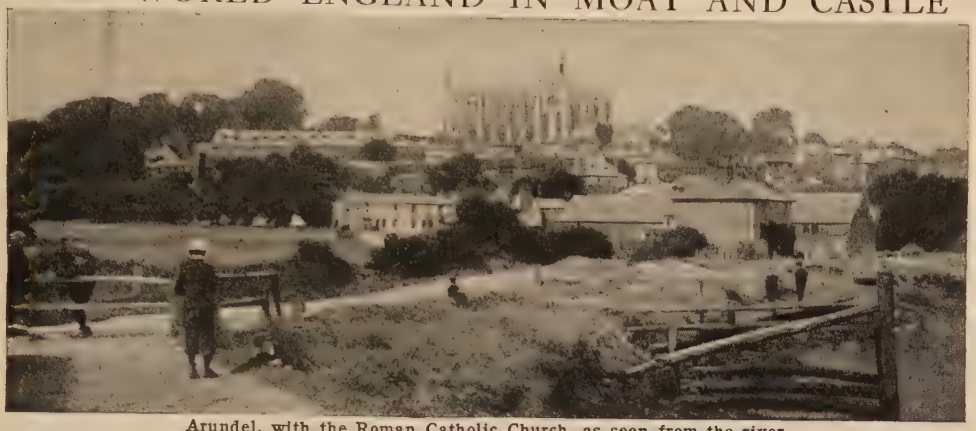
The coming of the railway was perhaps the greatest single event in the century, and we read of it on page 1611. The railways took the place of the system of canals that had begun to carry slow and heavy traffic; and till the coming of the motor car they also, for long distances, took the place of travel along the fine roads which had been made on the patterns of the Scottish engineers John Loudon McAdam and Thomas Telford.

THE COMING OF THE TELEGRAPH AND THE PENNY POST

These roads had been the means of spreading the cheap factory-made goods which took the place of village craftsmanship.

The telegraph, that wonderful time-saver before the telephone was invented, was first developed practically alongside the railways, for railway purposes,

OLD WORLD ENGLAND IN MOAT AND CASTLE



Arundel, with the Roman Catholic Church, as seen from the river.

Eridge Castle, Sussex.

The barbican of Lewis Castle.

The Stour at Fordwich, Kent.

Spithead, from Ryde, Isle of Wight.

A moated house at Groombridge, Sussex.

A street in Midhurst.

and thence it made its way into business. One of the greatest of all the quickeners of the life of England was the penny post, which had been adopted in London in the seventeenth century until suppressed by the Government. When the scheme was proposed by Rowland Hill it was looked on as a joke, but swiftly it proved an immense success, and not only a comfort to thousands of hearts and an ever-ready aid to business, but also one of the greatest spurs to education, for which it provided an immediate test—the reading and writing of a letter.

The expansion of business with the increase of national wealth and the growth of the deep sense of humanity were accompanied by extensions of freedom which are perhaps the greatest triumphs of the century.

Though in the year 1800 all the nations of Europe who knew anything about the world outside their frontiers regarded Great Britain as the home of liberty, and longed for liberty for themselves, and Englishmen were proud of their privileges contrasted with the serfdom prevalent on the Continent, yet it is amazing to realize how narrow were the bounds of liberty for a "freeborn Englishman."

THE WAY THE COUNTRY WAS RULED IN THOSE DAYS

If he fell into debt, he was liable to be imprisoned indefinitely in an unhealthy prison. If he broke the law in a trivial manner, he might be hanged or transported for life. If the people assembled, unarmed and inoffensive, in public meeting, they were liable to be ridden down by yeomanry as at Peterloo, where eleven were killed and hundreds injured in the panic flight. If a printer printed for a ballad-monger to sing and sell in the street a ballad about the fall of the Bastille in Paris—an event over which the world rejoiced—the printer was sent to prison, as actually happened to the saintly hymn-writer James Montgomery. If the worst specimen of a king who ever sat on the English throne—the German George IV—was criticized in any way approaching his deserts, the critic was promptly sent to prison, as happened to Leigh Hunt.

The government was controlled by one or other of two sets of nobles, who put into Parliament whomsoever they chose, and there were not twenty constituencies in the country which were free to elect their members. Whole sections of the citizens, such as the Jews, the Catholics and the Nonconformists (Protestants who did not belong to the English Church), were deprived of the most elementary rights in education and property-holding, as well as from serving their country.

THE VICTORIES WON BY BRITISH FAIRNESS AND FREE PLAY

Narrow-mindedness was deeply intrenched in all the regions of power, whether religious, political or social. It had dug itself in. But all through the century freedom and free play were being extended to all these minorities, so that at last Jews, Catholics, Dissenters and afterward even women inherited their equal civic rights and duties. This sweeping away of ancient wrongs was due in part to a wonderful broadening of thought that occurred during the century and affected life in every way.

One of the ways most easily seen was the gradual granting of self-government to the people. The foundation of popular government was the Reform Bill of 1832, which widely extended the right to vote. In 1867 all householders in boroughs were given the vote; in 1884 all householders in the country were added to the roll of voters; and in 1888 a Local Government Act provided that each parish, district, town and county should control its own public affairs, so that if people were not well governed locally, the fault was theirs.

By these changes and by giving the vote to women after the World War, the voters have been increased to twenty-two millions, and the choice of those who govern the country is left without reserve to the mass of the people.

The widening of thought and its achievements in freedom and humanity were accompanied by a literature which makes all other periods, except the Elizabethan, look poor by comparison. In poetry, it has Wordsworth, Coleridge, Byron, Shelley, Keats, Tennyson, Browning and Matthew Arnold; in prose, Scott, Jane Austen, Lamb, Hazlitt, Dickens, Macaulay, Thackeray, Charlotte Brontë, George Eliot, Froude, Hardy, Meredith, Kingsley, Carlyle, Ruskin, Stevenson, Darwin and Lyell—to make a miscellaneous assortment. We can read about these writers in the Book of Literature.

The story of England's doings, from the point of view of statesmanship, has not been one of failure. The darkest chapter in the story is that about Ireland (see page 2929), but even that chapter has had, we hope, a happy ending. With regard to the colonies the mother country has been very wise.

The American revolt taught the lesson. No attempts were ever made after that to force colonial opinion, and complete freedom was readily given to any British colony that wished for it.

The mother country frankly gave up the old idea she had had of *possessing* the colonies, and as soon as that was realized, a new bond was formed and proved strong enough to bear every strain, including that of war.

Conferences are held every few years in London at which the heads of the Dominions (as the big colonies are called) discuss with the English Cabinet the things which belong to the empire as a whole. Other matters the Dominions settle for themselves. Of the great changes in India, South Africa, Canada, New Zealand and Australia you can read in the special chapters devoted to these countries. In 1924 a great Imperial Exhibition took place at Wembley, near London, in which every country in the empire shared.

THE WARS OF THE NINETEENTH CENTURY

The Victorian era, though a long one, was not a very warlike one for Great Britain. In the middle of the century she was dragged into a war with Russia, because both France and England were afraid that if Russia did as she wished to her weaker neighbor, Turkey, she would become too powerful; so they backed the weaker power. The campaign was fought in the Crimea, a little peninsula to the south of Russia in the Black Sea. There had been no wars for a generation, and men had forgotten how to arrange and plan campaigns. Everything was so mismanaged that the soldiers had no proper clothes nor boots, food nor arms. The French and English tried to capture the great fortress of Sevastopol, but it had been strengthened by the great Russian engineer Todleben, and held out. Then the bitter winter and hardships of the trenches brought on such sickness that the miserable hospitals were soon overcrowded. Through the efforts of Florence Nightingale (see page 5703) some of the needless suffering was relieved. When Sevastopol fell, after a siege that had lasted a year, England went nearly mad with joy. Peace was proclaimed, and people hung out flags, put lights in their windows, went in processions and lit bonfires on the hilltops and in the open spaces, as the country had done after the defeat of the Armada.

The Indian Mutiny was peculiarly horrible, because the fighting was conducted on one side by natives who did not fight according to the recognized rules of war and in their excitement fired on and murdered women and little children. The army was small, a few British officers and some hundreds of native soldiers called Sepoys. Numbers of Englishmen, traders and officials of the company with their families, lived in different parts of India. Suddenly all the Sepoy regiments along the Ganges plain mutinied, shot their officers, seized the prisons and murdered all the white people they could find. At Cawnpore a horrible massacre took place; from Meerut the mutineers moved on Delhi, the ancient capital. After a memorable siege the place was taken by brilliant assault. At Lucknow the garrison held out and endured a long siege, relieved for a while by Outram and Havelock, and then for good by Sir Colin Campbell, who brought fresh troops from England. When the last embers of revolt were stamped out the Government of England took over India from the East India Company, so as to bear in a fuller way the responsibilities of so great a country.

The last years of the great queen were darkened by the shadow of a war against the Boers, or farmers living in the Transvaal and Orange Free State in South Africa. It was not a war that England undertook willingly, nor one of which she felt proud, but things had become so tangled between the English and Dutch settlers that there seemed no other way out. Over the vast veldt and among their *kopjes,* or hills, the expert Boer horsemen conducted irregular warfare with great success. Avoiding open engagements, descending upon British columns at the drifts or fords, retreating within their *laagers,* or wagon camps, their activities were most serious when the rains brought forage for their hardy

horses. Reinforcements were sent out, Lord Roberts made commander-in-chief, the cities of Kimberley, Ladysmith and Mafeking were relieved, but still the Boers held on. No one felt more sincerely for the sufferings of her soldiers than the aged queen, who died in January, 1901, before the war was finally brought to a close. The Prince of Wales succeeded to the throne with the title of Edward VII. In May, 1902, the war was ended, and in 1909 all South Africa, including the Cape of Good Hope, Natal, the Transvaal and the Orange Free State, became the Union of South Africa under responsible government. Edward VII, with his wide knowledge of foreign affairs and great tact, did so much to make friends for the empire that he was called the Peacemaker. Throughout the long reign of his mother there had been a quiet but persistent Germanization of the British court, but the aggressiveness of the young German Kaiser put an end to this. King Edward was a wise judge of men, and he realized where Germany was tending and quietly cultivated a useful friendliness with France and Russia.

In politics the Liberals came back to power after twenty years and passed a measure for old-age pensions. There was a fierce fight over the powers of the House of Lords which in the end were considerably limited. The Government itself was subjected to claims put forward by women to share more fully as citizens in the government of the country.

In Ireland the age-long disagreement took on an uglier look. Ulster, which was firmly determined to continue joined to Great Britain, proceeded to drill an army so that it should not be taken by Southern and Western Ireland. In response, these parts of Ireland proceeded to drill also, and so began a system of arming by the people which later proved ruinous to the whole country.

There was some slight uneasiness at the mustering of armies on the Continent, and Great Britain, under the influence of Admiral Fisher, reorganized her navy with new types of ships and modern commanders, and concentrated more of her ships in the North Sea. Under the War Ministry of Lord Haldane the army was changed too, and "territorials" with later training replaced the old volunteers. Then, like a bolt from the blue, came the crash of war.

The greatest of all wars was waged between August 1, 1914, and November 11, 1918, a war that cost 10,000,000 lives and changed the frontiers of thirty countries. In Britain parties and classes dissolved into one. Whatever was advised as best to do was accepted as a duty. As the war went on, the country (May 16) accepted conscription into the army: more than 5,700,000 men joined the army, and 500,000 the navy. Contrary to the expectations of the enemy, the great Dominions across the sea and India were as loyal as the homeland. India raised 1,400,000 men, Canada sent overseas 458,000, Australia sent 332,000, New Zealand 112,000, and South Africa 76,000. In all forms of service the British Empire enlisted more than 9,000,000 men, and more than three-quarters of a million laid down their lives. Nor were the women less ardent than the men. No work or danger daunted them. Such was the effect of their devotion that before the war was over they were granted the right to vote, by universal assent.

When the great conflict at last died down, the formation of many new states, with their boundaries to be settled and friendly relations established, left the world in an uneasy state for years. All the fighting nations were exhausted and most of them impoverished. Britain imposed heavy taxation to meet her debts and responsibilities, and by tremendous effort kept her credit high in the world.

Following the war came a settlement of Ireland by agreement between the English Government and the different Irish parties: Southern Ireland was to form a Free State within the Empire and have its own Parliament, while Northern Ireland formed a separate State with its own Parliament, and also (unlike the South) with members in the British Parliament.

A striking feature of the first quarter of the twentieth century was the growing power of the Labor party in Great Britain due to a nearly universal right to vote. In 1922 Labor formed the chief Opposition group in Parliament, when the Coalition broke up and Liberals and Unionists resumed their old party lines. Early in 1924 the Laborites began their first term of office with their leader, Ramsay MacDonald, as Prime Minister.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 2463.

SCENES IN THE BRITISH ISLES

THE QUIET HARBOR OF FOWEY, IN CORNWALL

THE AVON WINDING AMONG THE TREES AT STRATFORD, BIRTHPLACE OF SHAKESPEARE

THE SNOW-COVERED CAP OF BEN NEVIS RISES LIKE A SENTINEL ABOVE THE QUIET VALLEYS

PERHAPS THE MOST BEAUTIFUL STREET IN BRITAIN—PRINCES STREET, EDINBURGH

THE OLD-WORLD VILLAGE OF CADGWITH, IN CORNWALL

THE PLACID WATERS OF THE NORFOLK BROADS

THE RIVER DART FLOWS THROUGH DITTISHAM, IN DEVON

AN ANCIENT STREET IN YORK—
THE SHAMBLES

QUEEN ELEANOR'S CROSS
AT GEDDINGTON

A GLIMPSE AT RIEVAULX ABBEY
IN YORKSHIRE

THE LITTLE DEVONSHIRE TOWN
OF CLOVELLY

THE ROCKY COAST OF OLD ENGLAND
AT KYNANCE, IN CORNWALL

A LITTLE BIT OF IRELAND—SNEEM BRIDGE, IN COUNTY KERRY

HILLTOP RUINS OF CORFE CASTLE, IN DORSET

THE OLD TUDOR HOUSE OF IGHTHAM, KENT

RUGGED HEIGHTS OVERLOOKING ABERGLASLYN PASS, IN WALES

THE RARE OLD VILLAGE OF LYNMOUTH, IN DEVON

WHAT THIS STORY TELLS US

WE think of stone as having always existed, and the stones of the earth were made a very long time ago. Man is making stone every day, however, and you have probably seen it many times. This story tells how a mixture of Portland cement, sand and pebbles may be poured into any shape, and how it gradually becomes solid stone. Few discoveries have been more important than that limestone or marl, heated with clay and ground to powder, makes a substance which is as strong as most stones, and can easily be made into any form desired. Every year concrete, as the mixture is called, is used more and more in building houses, streets, bridges, floors and dozens of other things.

HOW MAN MAKES STONE

CONTINUED FROM 2184

ALL of you have seen houses, walks, roads, walls and steps that looked like stone but were not stone. Perhaps you have seen men making them, but did not understand how a mixture of gray powder, sand, gravel and water could make a stone as hard as that which comes out of the earth. This story is to tell you how it is done.

First you must know that making stone is not a new idea. The old Romans made it, and some of the things they made are strong to-day, after two thousand years. Men soon learned that when lime was made wet and allowed to dry it became hard. Since lime was sometimes hard to get, they found that it was still strong when mixed with sand. This is the common mortar which holds together the bricks in a wall. This mortar is a kind of stone. Later men found that if they mixed lime with other things they had a still stronger substance.

In 1824, over a hundred years ago, an Englishman, Joseph Aspdin, a mason, burned limestone and clay together, and ground them into a fine powder. He found he had a substance which, mixed with water and then allowed to dry, was as hard as some popular building stones. Because the blocks he made looked like the stone which came from the Portland quarries he called it Portland cement, and this name is used everywhere to-day, though the substance has nothing to do with Portland.

Cement is composed of lime, silica and alumina. All that is needed to make Portland cement is to burn a limey substance with a clayey substance and to grind the result into a powder. In England they often use chalk with mud from the rivers. In North America there are many kinds of stone and clay which can be used, and since 1872 good cement has been made in America. To-day little or no cement is imported. If the right proportions of lime and clay are put together, it makes no difference what is used.

Blocks made of cement alone are not used very much. It was soon found that cement could be mixed with a great deal of sand and still be as hard as necessary, and would be even better for some purposes; and then it was found that pieces of broken stone could be used in addition to the sand and still leave the mixture strong enough for most purposes. This mixture, then, of cement, sand and small stone, is called concrete, which means "grown together," or "hardened."

Now concrete is the substance of which we build sidewalks, roads, steps, foundations, walls, dams, bridges, pipes, vats, fence posts, floors, drinking troughs, houses and dozens of other things. You can think of some of these other things if you try. These things can be done quickly and much more cheaply than if they were made of stone or metal. Now let us see how they are done, and what happens.

If you put all the potatoes you can into a pail, you say that it is full, but that is not quite true. You can still put in a quantity of beans which will partly fill the spaces between the potatoes. Even yet some sand will fit in between the beans, and you will find that you can still pour in some water without making the pail overflow. Something like this happens when concrete is made.

Concrete water tower in Little Bear Valley, California.

The sand partly fills the spaces between the pebbles or pieces of stone, and the fine cement fills the spaces around the grains of sand and with the water makes all stick together. Every grain of sand must be coated with a thin paste of the cement, and the sand and cement must fit tightly around the stones. If any air spaces are left, the concrete will not be strong and will not hold water.

Perhaps you have seen men mixing all these things together in a box or on a platform on the street or at your home. Where a great deal of concrete is to be used, as when a whole street or road is to be paved, or when a great bridge is to be made, you will see a large steel mixer into which all the materials are poured. This is made to revolve by an engine, and to it the men come with their wheelbarrows for a load, or the mixture may be loaded into wagons or buckets.

THE MATERIALS MUST BE MIXED VERY CAREFULLY

Do not think that the materials are thrown together without any plan. The cement is expensive, and so no more is used than is necessary, but if too little is used the work will not be strong. By experiment men have found out the quantity of each material it is best to use. For some kinds of work one part of cement, one of sand and two of stone are used. For other kinds of work another part of sand, or even two more parts, may be added, and from two to five parts more of stone. We speak of one mixture as 1:2:4. This means one part of cement, two parts of sand and four parts of stone are used.

The mixture is not hard when it comes out of the mixer, and so must be held in shape. This is done by forms, which are generally made of boards. If a wall is being built, boards are placed just the right distance apart, and the mixture is poured between them. In making a sidewalk boards are placed the desired distance apart, and concrete is placed between them. You can make a trough by hanging one box inside a larger one and pouring the concrete in between. The water begins to evaporate very soon and the concrete begins to set. The water must not be allowed to evaporate too rapidly, however, or the concrete will be weakened. Concrete will harden under water, in fact. In a few days it is quite hard and the forms may be removed, but it continues to grow harder for about two years. To make the surface smooth a thin coat of cement and sand without stone, or of cement and water alone is plastered on. Sometimes concrete blocks of convenient size are cast, and the wall is built of them, and cement mortar to fill the joints.

STONE IS STRONG IN ONE WAY AND WEAK IN ANOTHER

Stone will support a very heavy load if that load is placed directly upon it, but it breaks easily if the weight is placed upon

a part that is not supported. A stone beam is not very strong, but a stone pillar will bear an immense load. We say that stone, and concrete, too, are strong under compression, but weak under tension. But we can make concrete stronger than stone. By placing steel bars in the forms and pouring concrete around them beams are made much stronger. Sometimes a web of heavy wires is buried in the concrete.

This combination of concrete and steel is called reinforced concrete, and is very strong. Concrete stands fire very well, and floors of concrete with steel rods through them are used to help make buildings fireproof. Such a floor is stronger than if made of real stone.

Perhaps some of you have ridden in the subways in New York. For most of their length a wide and deep ditch was dug. A skeleton of steel beams and rods was made for roof and sides, forms were placed around them, and the concrete was poured in. The result is a water-tight tube which supports the traffic above without difficulty. Most of the large structures shown on the picture pages of this story are built of reinforced concrete. The next time you pass a place where a large building is going up try to find the steel rods imbedded in the floors.

NEW USES FOR CONCRETE ARE CONSTANTLY BEING DISCOVERED

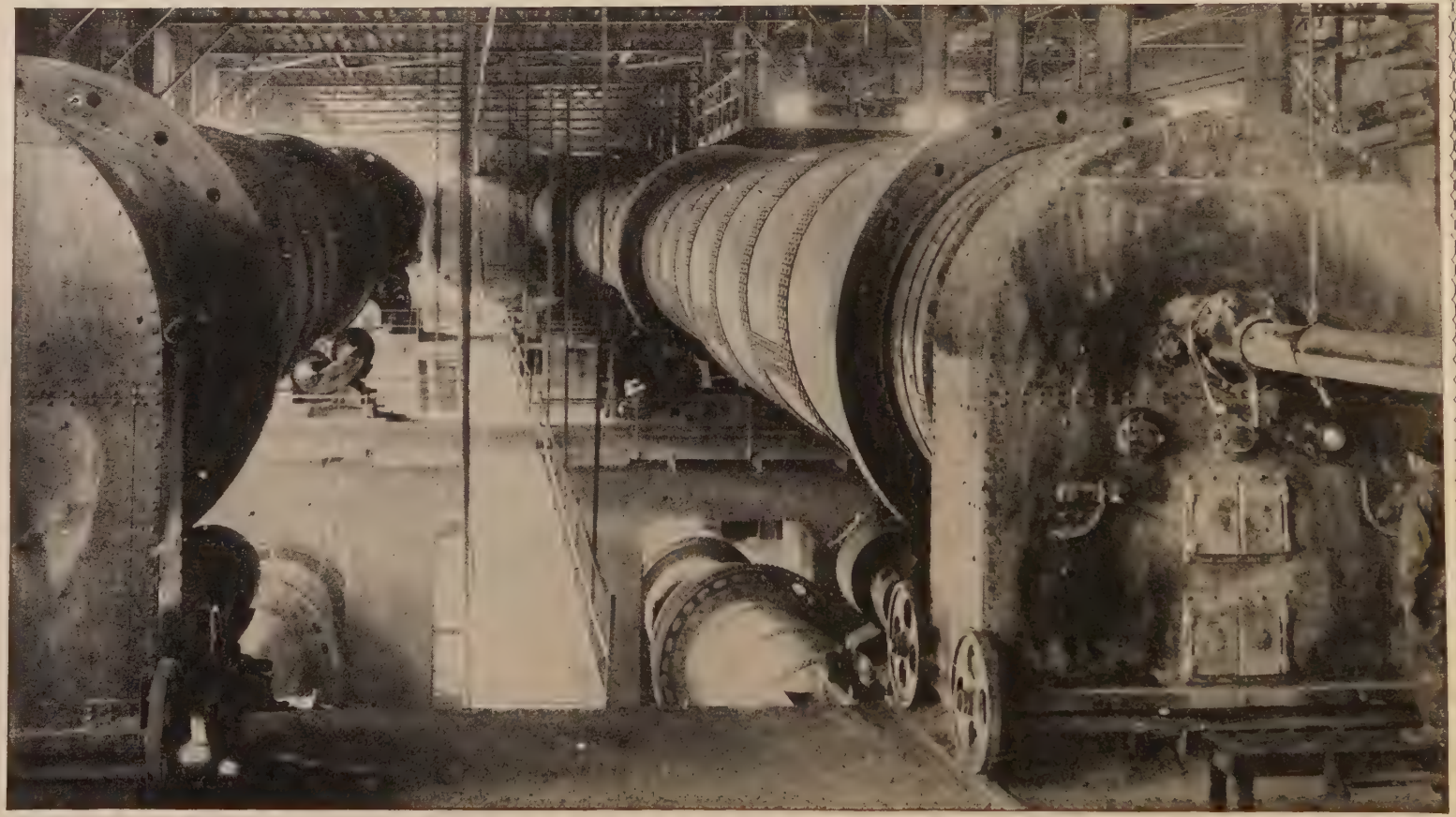
New uses are constantly being found for cement and concrete. For several years concrete had been used for barges around harbors, but in 1918 real concrete ships were launched. Steel rods were bent into the proper shape and concrete was poured into forms around them. If these ships prove themselves able to stand the strain of rough weather, a great change in the building of ships will follow. Ships can be built of concrete more quickly and more cheaply than of steel. Think of ships of stone on the world's highway!

Thousands of miles of concrete roads have been laid in the United States and Canada. In the United States alone enough has been laid to make twelve roads from the Atlantic to the Pacific. This is a bit of the Chuckanuck Drive near Bellingham, Washington, and is a part of the Pacific Highway.

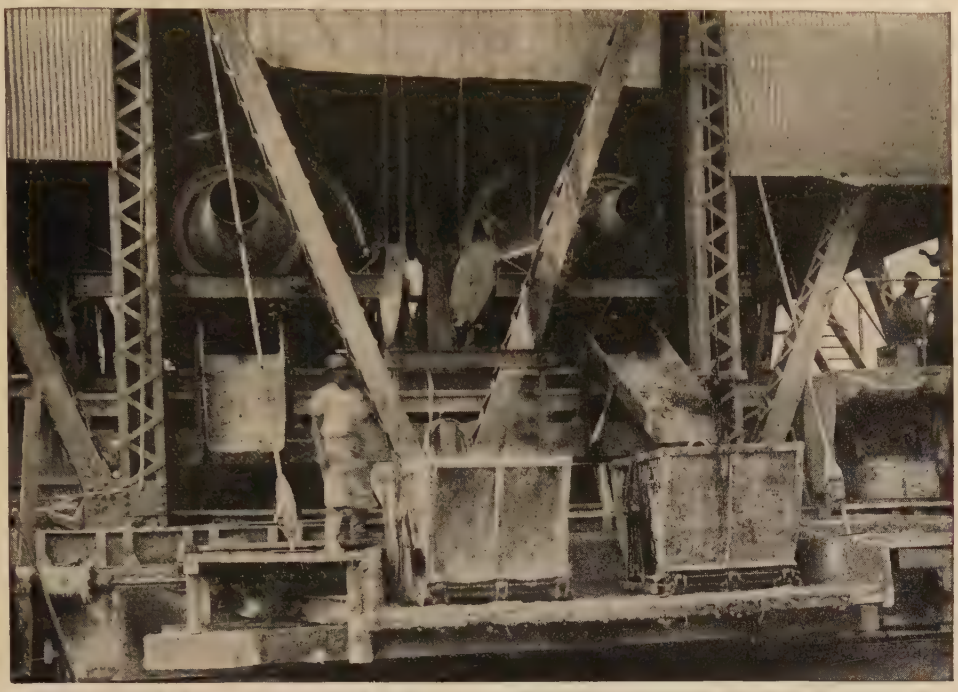
Besides the pictures belonging to this story showing the use of concrete, you may see a flour mill and storage bins built of this material on page 377, and a grain elevator on page 4522. Many of the bridges you see are of concrete, and the great dams and wharves in many places. The Catskill Aqueduct, of which we tell on page 5055, is largely concrete.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 2445.

THE GREAT ROTARY KILNS WHERE MATERIAL FOR CEMENT IS BURNED



In these great rotary kilns the raw material for cement is burned. They are made of metal lined with fire-brick, and some are as long as a twenty-story building is high. The raw material, together with finely powdered coal, and sometimes oil and gas, is introduced, and the heat produced is greater than is required to melt steel. The resulting "clinker," together with a little gypsum, is ground into fine powder after it has cooled.



Millions of yards of concrete were used in the construction of the Panama Canal. Here are two of the huge mixers into which cement, sand and broken stone and water were poured and churned together. They were then tilted forward, and the moist mass was deposited in the huge square buckets which were swung off by a crane. Thousands of pounds were mixed at a time.

This picture will give you an idea of how a great concrete bridge is made. The false arch of wood is left in place until the concrete has hardened. Above you see the wooden forms with steel rods sticking from them. The concrete is carried to them over the wire ropes, which make a sort of railway in the air.

A FINE EXAMPLE OF CONCRETE CONSTRUCTION

On the Lackawanna Railroad are some fine examples of concrete construction. The Tunkhannock Viaduct is shown in the story of Bridges. This is the Martin's Creek Viaduct, which is nearly a third of a mile long and 150 feet above the bed of the creek. Some of the spans are 150 feet. In making it, 77,500 cubic yards of concrete and 1,600,000 pounds of steel were used. The old line of the railway is on the right. Much money has been spent by the railroads to make their tracks more nearly level.

A CONCRETE SHIP IN THE WATER

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Here is the deck of the concrete ship Faith just before it was completed. As you see, the deck and the coamings around the hatches, as the square openings through the deck are called, are of concrete. The boat is built entirely of concrete, reinforced with steel, and was made in forms, a little at a time.

On her trial trip across San Francisco Bay, the Faith surpassed the expectation of her builders, both in speed and smoothness of motion, easily making ten knots. The boat is 320 feet long, and will carry 5,000 tons of freight. As boats can be made of concrete in much less time than they can be built of steel or wood, we are likely to hear much more of them in the future. Many of them have already been built.

SOME MONUMENTAL STRUCTURES BUILT FROM CONCRETE

The Coliseum at Los Angeles is large enough to seat comfortably 75,000 persons, each of whom can have an unobstructed view of the field in the centre. The thousands watching this football game would fill most ordinary athletic fields, but here they are almost lost in the immense concrete structure.

2312

This is a part of one side of the new Municipal Stadium in Chicago. The whole structure, pillar and all, is of concrete, and shows how well the material lends itself to elaborate architectural design.

Muscle Shoals is a succession of rapids in the Tennessee River in northwest Alabama. Here the United States Government has been developing an enormous water power. This is the Wilson Dam, which will be the largest dam in the world.

The great crater of Vesuvius showing renewed activity.

MOUNTAINS AND GLACIERS

CONTINUED FROM 2176

WITHOUT mountains there would probably be no world as we know it to-day. If the crust of the early world had not been wrinkled and irregular, with the ups and downs and ridges and peaks that we call mountains, the sea would have covered the whole globe, and the earth would have been a home fit only for sea animals and sea plants.

What shape the first mountain ranges of the world took we do not know. Perhaps they were great slabs of broken crust piled on each other like hummock ice. Perhaps they were gigantic wrinkles in the crust, where the earth shrank away from the outside crust as an apple from its skin.

However that may be, it is almost certain that the most striking features in the jagged mountains of that early level must have been tremendous volcanoes such as to-day we see in the moon. The moon, indeed, is a picture of the earth as it might have been if its crust had been dry. Thousands of volcanoes, snorting out gas and steam, were the mountain kings of the early world, and we see their remains to-day in the granite and basalt and schist which once gushed out of them as lava. In time their own steam, condensing into rain and rivers, helped wear them down into mud, and only a few traces of them still remain. Arthur's seat, in Edinburgh, is the remains of a great volcano, and the Lewis Islands in the Hebrides are made of very ancient volcanic lava.

Long, long ago these first giant volcanoes disappeared as mountains and were replaced by mountains made of their mud. Then through the mud burst out newer volcanoes, some of which remain to this day to arouse our wonder.

Among modern volcanoes are some of the highest, most impressive and most picturesque mountains in the world. In Europe we have Etna, 10,750 feet; Vesuvius, 4,300 feet; and Hecla, 5,100 feet. In South America we have the magnificent giants Aconcagua, 23,290 feet; Cotopaxi, 19,500 feet; Chimborazo, 21,424 feet. In North America we have the rival giants Orizaba, 18,314 feet; Popocatepetl, 17,843 feet; and Mount St. Elias, 18,024 feet. In Africa are also giants: Kilimanjaro, 19,456 feet; and Kenia, 18,000 feet; while in Japan is Fujiyama, 12,362 feet; and in Java is Semeru, 12,000 feet. These give us some idea of the enormous volcanic forces which have taken part in the making and remaking of the earth's crust.

Some of the modern volcanoes—there are still about a thousand to be found—are extinct; but about thirty per cent of them are still alive. Stromboli has been pouring forth lava for two thousand years, and still is in

violent eruption. Vesuvius destroyed Pompeii and Herculaneum within historic times, and only a few years ago the town of St. Pierre, in the West Indies, was laid in ruins by the terrible eruption of Mount Pelée.

THE TREMENDOUS VOLUME OF MATTER FLUNG OUT OF A VOLCANO

The amount of material hurled forth by volcanoes is enormous. Sumbawa, when in eruption in 1815, discharged enough solid material to make nearly two hundred mountains as big as Vesuvius. Mount Pelée threw up more solid matter in a minute than the Mississippi brings down in a year. The matter flung out from Tomboro would have been enough to build up three Mont Blancs. Mount Etna steamed forth 462 million gallons of water in a hundred days. From all these facts we may imagine that the primitive volcanoes had probably a great deal to do with supplying the sea with water and with causing some of the caverns into which the first rivers flowed.

Magnificent and terrible though modern volcanoes are, they are not now the chief mountains of the world. The chief mountains, as we have already said, are the mountains formed of the volcanic mud in the bottom of the sea, by the crumpling of the earth's crust after the mud had been laid down. Most of these are made of lime, as creatures in the sea collected the lime from the sea-mud and made it into shells which heaped up on the floor of the sea. The Alps, the Pyrenees, the Apennines, the Rockies, the Himalayas, with the unconquered peak of Mount Everest, are all made of volcanic mud carried by rivers into the sea. That is one of the most wonderful things about this wonderful world.

THE LITTLE SEA CREATURES THAT HAVE BUILT UP THE CLIFFS

Yet still more wonderful is the fact that the chalk in the Cliffs of Dover, the hard limestone in the Alps, the Dolomites and the Carpathians, the marbles of Tennessee and the limestone of Indiana were all collected during millions of years by millions of little sea creatures—many of them so small you cannot see them. But you have only to grind down a little chalk in water and look at it through a magnifying glass to see that it is made of little shells. Many of the great mountains, indeed, are just tiny skeletons piled mountain-high. Think of it! The lava thrown forth by a fiery volcano is ground down by a volcano's own steam into mud. Then the particles of lime are carefully picked out of the mud and made into shells. Then, when the shells have been piled up miles high we have a mountain rising out of the sea!

But why did the mud rise out of the sea? Why did the muddy, limy floor of the sea crumple up into mountains, not once but several times? That is very hard to answer. Nobody knows exactly why it happened; but it was probably part of the general crumpling of the crust, causing risings and fallings here and there. Scientists who have specially studied the question believe that as the mud accumulated on the ocean floor it raised the temperature of the crust under it. This caused the crust to expand and squeeze the mud up out of the hollow.

THE OCEAN BEDS THAT HAVE RISEN AND GROWN INTO MOUNTAINS

Whatever the cause may have been, it is quite certain that ocean beds have frequently risen up as mountains, and that mountains and continents have sunk beneath the sea. It is also certain that if they had not risen, there would be no solid land to-day, for rain, and rivers, and frost, and wind, and waves would have carried all the solid land into the sea.

Even if flat plains had been left, what a different world it would have been—a world without hills and mountains and rivers, a world all marsh and bog! In the words of Ruskin, we have a beautiful world "gathered up in God's hands from one edge of the horizon to the other like a woven garment, and shaken into deep falling folds as the robes droop from a king's shoulders; all its bright rivers leaping into cataracts along the hollows of its fall; all its forests rearing themselves aslant against its slopes, as a rider rears himself back when his horse plunges; all its villages nestling themselves into the new windings of its glens; all its pastures thrown into steep waves of greensward, dashed with dew along the edges of their folds, and sweeping down into endless slopes, with a cloud here and there lying quietly half on the grass and half in the air."

That is our world now, but without mountains we should have no glens, no rivers, no waterfalls; and the world would be robbed of a great part of its beauty.

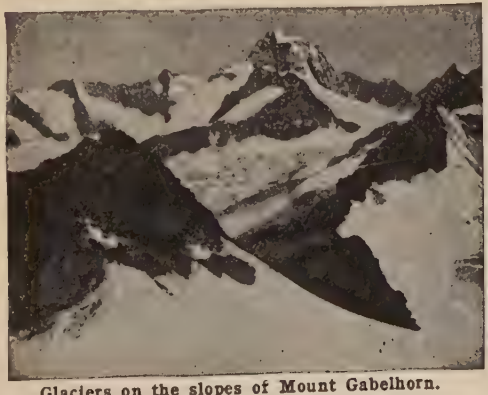
And not only would half its beauty

HIGH MOUNTAINS IN THREE CONTINENTS

The striking mountain peaks known as the Lions, looking over Vancouver.

Mount Pelvoux in the Dauphiné Alps.

Mount Weisshorn in the Alps.



Glaciers on the slopes of Mount Gabelhorn.

Hochstetter ice-falls, New Zealand Alps.

go, but its whole climate would change. Were the Himalayas laid flat, India would be many degrees colder, and perhaps converted into a desert. Many lands, too, are watered by rivers which have their source on mountains hundreds of miles away. The Nile made Egypt, the Nile waters Egypt; but there would have been no Nile to make Egypt were it not for the snows on African mountains, and the streams running down the upland rocks of Abyssinia.

Most of the mountains of the world show signs of having been several times up in the air, and several times down in the sea. Perhaps at the present moment a new continent, a new mountain range may be beginning to rise from some ocean bed. The days of such wonderful mountain-making may be over, and when the rivers have worn down the present ranges, perhaps no new ones will arise. We do not know; but at least it is good to know that, however hard the rain and the rivers and the glaciers and the wind may work, our mountains have still some millions of years before them.

THE GLACIERS—THE BEAUTIFUL WHITE CHILDREN OF THE MOUNTAINS

We cannot leave mountains without a word about their white children the glaciers. Most of the high mountains get their heads so far through the blanket of air that, except when the sun is shining, they are very cold, and so are always covered with snow and ice. Year after year snow may fall and remain on their summits, and, as on many mountains the snowfall is thirty or more feet every year, the mountain would soon get a cap of snow and ice as big as itself. But of course the snow rapidly or gradually slides down. Some of it slips down as loose snow in avalanches, and some heaps up in its valleys and becomes squeezed together into the rivers of ice known as glaciers. Usually the glacier flows slowly down the valley, impelled by the ice behind it, but it melts into a stream at its lower end.

In Switzerland there are about two thousand glaciers, most of them three or four miles long. One great glacier, the Aletsch, is ten miles long and more than a mile broad. The quantity of ice in these glaciers is difficult to imagine. In the Görner Grat glacier, on the Matterhorn, there is more than enough ice to make a windowpane for every window in England. The polar glaciers are still bigger, and one called the Humboldt is 66 miles across.

THE MARKS THAT A GLACIER LEAVES BEHIND ON ITS WAY

As these great glaciers flow down their mountain valleys, scratching and grinding the rocks over which they pass, they sometimes carry great boulders as well as heaps of stones on their backs. If, as sometimes happens, a big glacier in the course of ages melts quite away, it leaves signs of its career behind it in the shape of scratched rocks, in tremendous collections of stones known as "moraines" and in big boulders known as "erratic" boulders.

Sir J. M. Barrie has given us a graphic and terrible picture of a glacier yielding up its dead. In his address on Courage to the students of St. Andrews, the creator of Peter Pan said:

> When I think of Scott I remember the strange Alpine story of the youth who fell down a glacier and was lost, and of how a scientific companion, one of several who accompanied him, all young, computed that the body would again appear at a certain date and place many years afterward. When that time came round some of the survivors returned to the glacier to see if the prediction would be fulfilled; all old men now; and the body reappeared, *as young as on the day he left them.*

We find that there were periods, thousands of years ago, when all England and Northern Europe were under glaciers. Switzerland was full of them, and the Rhône glacier extended right into France. Other parts of Europe had their share, and North America had three great ice-sheets. All Canada was covered, all New England and New York, the country about the Great Lakes and westward across British Columbia; other sheets covered the Rockies and the Sierra Nevadas.

There seem to have been several of these cold periods—Glacial Periods, or Ice Ages, as they are sometimes called—in prehistoric times.

THE MEANING OF THE GREAT ICE AGES OF THE PAST

Many attempts have been made to explain these Ice Ages. Some think they were due to changes in the angle of the earth's axis, and some think that they were due to changes in the earth's atmosphere or the heat of the sun. But no one really knows.

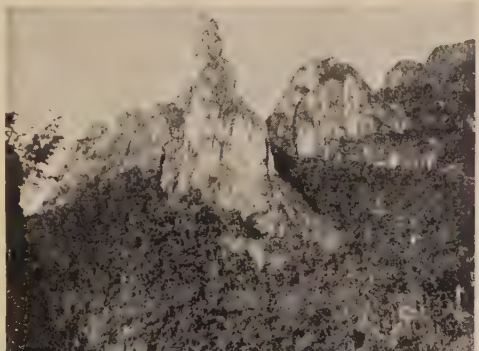
THE NEXT STORY OF THE EARTH IS ON PAGE 2415.

PEAKS OF SOLEMN GRANDEUR

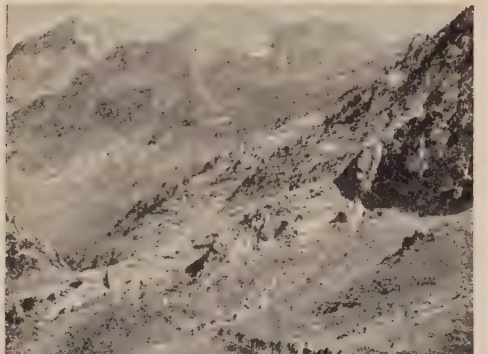
The snow-capped cone of Fujiyama, the sleeping volcano in Japan.

The rugged peak of Mont Blanc.

Mount Kinchinjunga in the Himalayas.



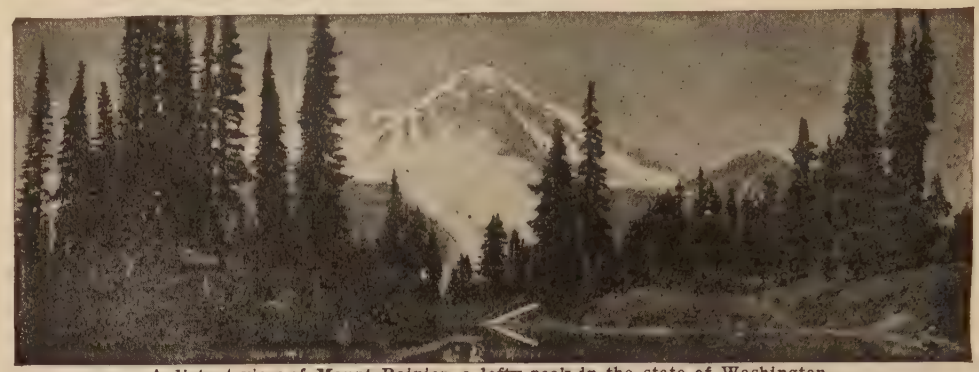
The jagged line of the Brazilian heights.



Striking heights of the Pyrenees.

Photos, New Zealand Government, Messrs. Holloway, F. V. McConnell, Herbert G. Ponting, Donald McLeish.

VOLCANOES AND FROZEN GLACIERS



A distant view of Mount Rainier, a lofty peak in the state of Washington.

The Mexican volcano Colima in violent eruption.

Lava pouring from a volcano in action.

Matavanu, a volcano in the Pacific island of Savaii.

Mountains rising from a plain in Utah.

A wonderful glacier in Spitsbergen.

Summit of Mount Roraima, British Guiana.

Tasman Glacier, New Zealand Alps.

CHER AMI, D. S. C.

THE STORY OF A CARRIER PIGEON

CONTINUED FROM 2010

THE cooing pigeons flying around the old homestead remind us that they, too, had a very important part in the World War, for some of the greatest heroes were the carrier pigeons. One of the bravest of them was an American bird, the famous little hero that did so much to help save the "Lost Battalion" under Major Whittlesley. It had a beautiful name: "Cher Ami" (Share-ah-me), which means "dear friend."

In the engagement in the Argonne forest, where so many American boys are buried, Major Whittlesley, in command of the battalion, marched so fast that he found himself ahead of the line and surrounded by the enemy. The barrage fire of the Americans was coming over; but instead of falling among the enemy, it fell among their own boys, who remained "cooped up" in the woods, the Bois du Beuge, for six days, starving. The airplanes tried to drop them food, but Whittlesley did not betray where he was, because the enemy would have slaughtered all of them. Already one-half of the men were killed, all were starving, and many were wounded. They tried to "dig in," but it was too rocky. Men were sent back to tell the Americans either to stop the fire or to advance it, but they could not get through because they were surrounded.

Their only hope was their four pigeons. They put the message on three and freed them, but they never heard from them. Then they sent their last pigeon, Cher Ami. They wrote a message telling where they were and asking to have the fire advanced or stopped, and to have help sent. This message they put in a little aluminum capsule, fastened it to the left leg of the pigeon, and opened the coop. Up Cher Ami rose until he was high enough. Back he flew in a bee-line, dropped into the coop, and delivered the word which saved the rest of the battalion. But that was not the only deed which won the silver medal.

Sometime afterward the whole division crossed the Meuse River, climbed the hill, and broke the line. They hurried to send word back to Rampont. Cher Ami was with them, and Rampont was his home. They put

the message on him, and up, up, up he went until he reached the proper height to fly. Then suddenly he stopped, and as the soldiers watched he began to fall, tumbling through the air—fifteen, twenty, twenty-five feet! Breathlessly they cried: "He's killed, he's coming down!" But God has made the carrier pigeon so wonderful that it never gives up until it is killed or severely wounded. He stopped for a second or two. Recovering himself, he began to fly, and while the machine guns of the enemy were turned on him, he flew thirty-five miles in twenty-five minutes, and fell into his coop.

These pigeon coops are so delicately adjusted by electrical wires that when even a little pigeon alights on the bottom it makes a connection and sounds a buzzer. When the guard came in he found Cher Ami on his back. He was all blood and feathers. Picking him up, he found the pigeon was still alive; but his breast was torn away and his left leg was shot off, although the message was dangling to the tendons. He had been hit twice at the start, but he did not give up. They nursed him back to life, and when General Pershing heard about it, he gave the little hero a silver medal and sent him home to Washington.

After the war Lieutenant Harry Webb Farrington, who writes this touching story, spent many hours in the capital looking for Cher Ami. Finally he found him and held him tenderly in his hands. The heroic little bird had a hole in his breastbone as large as a quarter, while the left leg was gone. It is a wonderful study of "Never Give Up." You will find the poem about this brave little bird on page 2151.

GREATER LOVE HATH NO MAN THAN THIS

TWO brothers had decided that the best way to spend their lives was in holy service. Their ideal of holy service was to enter the priesthood. Accordingly, the early Sixties saw them studying side by side in the seminary at Louvain, Belgium, to become priests. The older had quite set his heart on devoting his ministry to some un-Christianized country; in fact he had engaged to go, at the end of three years of training, as a missionary to the South Sea Islands. The younger, Joseph by name, then nineteen years of age, had not yet made up his mind as to how he could best serve God. Some devout souls decide this for themselves; for others the way is pointed out by a power mightier than self.

Joseph was by nature singularly fitted to minister to others. It was said of him that in his youth he was doctor, nurse, carpenter, school-teacher, magistrate, painter, gardener, cook, and sometimes even undertaker and grave-digger. In his native town it is still remembered how he could turn his hand to anything that needed to be done. As the time approached for the elder brother to set out on his foreign mission, it so happened that he fell grievously ill with a wasting fever. Day by day he grew paler, weaker and more melancholy. "I shall go in your place!" said the younger brother quite eagerly. And so it was Joseph who was destined for the greater sacrifice.

And why should Joseph (upon taking orders he changed his secular name for the religious name of *Damien*) have been so glad to go into exile? Why was he so willing to leave forever the land where people spoke his own language and where all the customs and habits were familiar to him? How could he with light heart say a last farewell to family and friends? Because more than the good things of life, more than the happiness of home, more than father and mother, he loved the example of the Savior who went about doing good; who called upon all who love him to take up their cross and follow him.

At the age of twenty-two Father Damien set out for the South Sea Islands. These islands lie in the Pacific, about halfway between America and Australia. Although they were discovered by Captain Cook in 1778, it was not until the next century that white men visited them, and these men were chiefly traders and whalers who took there the curse of drink and other vices carrying disease in their train. It was one of the most depraved of all heathen lands. Cruel and absurd customs prevailed. If a man allowed so much as his shadow to fall upon a chief, he was speedily put to death; no woman might eat with her husband, nor might any touch food offered to the idols.

"How did you lose your eye?" a little girl was asked. "I ate a banana," the child replied. Such was the country to which Father Damien journeyed and where for ten years he served faithfully among the natives as a Christian missionary.

One day he heard the good bishop lamenting that he had no one to send to the lepers in Molokai. "Monseigneur," said the father, "if you will be kind enough to allow it, I will go to Molokai to the poor lepers whose wretched state of body and soul has long made my heart bleed within me."

FATHER DAMIEN, WHO GAVE UP HIS LIFE

He went out from Belgium to help the lepers in the South Sea Islands. He left his own country and became a leper, giving his strength and his life to these afflicted people. Portrait by Edward Clifford, photographed by F. Hollyer.

To go from Belgium to the savages was a great sacrifice, but to go from the savages to the lepers was far greater.

Leprosy is the most loathsome human disease. It comes of unclean habits of living. We do not know how far back it dates, but there is mention of it throughout the Bible even before the time of Moses. It was early prevalent in China, and at a later time spread through the European countries. The only way the disease can be stamped out is to isolate the lepers so that the disease cannot spread. Thus the lepers have a horrible existence among themselves with nothing to look forward to but increasing suffering and merciful death. If anyone touches a leper he is almost sure to take the hideous disease.

Leprosy had become so prevalent in this poor country that in order to save the nation it was necessary to follow the example of the European countries,—to isolate the lepers and send them into exile. Now this was not an easy thing to do. The Hawaiians are a very affectionate people, quite unafraid of either disease or death. The lepers were loath to leave their families and friends, and those who were still healthy preferred to run the risk rather than part with loved ones. They concealed the lepers, who had to be found in secret places and taken by force, with such heartbreaking scenes as we can hardly imagine. To the little lowland beneath the cliff of Molokai, one by one they were taken.

Father Damien found the leper colony in a wretched condition. The lepers were living as best they could under frail roofs made of branches, victims of all ages and sexes huddled together, without care, cheer or comfort. "In this place there is no law," was the slogan, and the victims urged on death by an intoxicating drink which they concocted out of the root of the herb ki growing in abundance around them.

Father Damien saw that the greatest need was water, for the people were very filthy. They did not want water; certainly they would not fetch it on their shoulders from a distant spring. Far up in the mountains Father Damien discovered a spring of pure water, and appealing to the king and queen of Hawaii, found them so generous as to build water-pipes to bring water to the sufferers and to construct decent houses for the lepers. Thenceforth they were housed in clean, comfortable cottages, stout enough to withstand the fierce winds that rage at certain seasons.

In due time Sisters of Charity of the Franciscan Order came to assist him; schools were built and hospitals, where the worst victims received such medical aid and care as could alleviate their sufferings.

Occasional travelers were brave enough to visit the leper colony to encourage the noble work of Father Damien. One wrote: "The first glimpse of Kalawao might lead a stranger to pronounce it a thriving hamlet of perhaps five hundred inhabitants. Its single street is bordered by neat whitewashed cottages with numerous little gardens of bright flowers and clusters of graceful and decorative tropical trees. By the roadside, on the edge of the village, between it and the sea, stood a little chapel. The chapel door stood ajar; in a moment it was thrown open, and a young priest paused upon the threshold to give us welcome. His cassock was worn and faded, his hair tumbled like a schoolboy's, his hands stained and hardened by toil; but the glow of health was in his face, the buoyancy of youth in his manner; while his ringing laugh, his ready sympathy, and his inspiring magnetism told of one who in any sphere might do a noble work, and who in that which he has chosen is doing the noblest of all works. This was Father Damien, the self-exiled priest, the one clean man in the midst of his flock of lepers." This is a picture of Father Damien as we like to remember him.

Robert Louis Stevenson, spending his last years in the South Sea Islands, himself in a hopeless quest for health, visited the leper colony. This was before so much had been accomplished. He described the place as "grand, gloomy and bleak." But with characteristic spirit of good comradeship he rode over daily for seven days from the place where he was staying, to play croquet with the little leper girls. He found that they loved their dolls, just the way other little girls do. So he wrote back to his old home in Scotland and asked his friends to send pieces with which the little leper girls might make clothing for their dolls. We can imagine that this genial man was very popular with the poor little victims. To one of his friends he wrote: "I am just home after twelve days' journey to Molokai, where I can only say that the sight of so much courage, cheerfulness and devotion strung me too high to mind the infinite pity and horror of the sights. . . . I have seen sights that cannot be told, and heard stories that cannot be repeated: yet I never admired my poor race so much, nor (strange as it may seem) loved life more than in the settlement." Stevenson came to know Father Damien very well and greatly honored his labors. He did not find the good father perfect—who ever is?

When Father Damien had been some ten years among the lepers, cleansing their wounds and caring for their souls, he began to have grave fears that he himself had become a leper. The doctor told him not to alarm himself. But one day he let fall upon his foot some scalding water and did not feel it. Now, want of feeling when there should have been pain, he knew to be a sure sign. He went at once to the doctor, who examined his patient and was obliged to say: "I cannot bear to tell you, but what you say is true."

"It is no shock to me," replied the priest, "for I have long felt sure of it." He was not at all disturbed. In sinking to the level of his people, he rose to still greater heights of heroism. Some whom he had offended by his reforms became his devoted adherents; as a leper among lepers he was one with his people.

The second Sunday after Easter, 1889, was his last Sunday upon earth; he heard read the Gospel for that day, in which are the words, "I am the Good Shepherd; I lay down my life for the sheep." It was with great difficulty that the attending priests and sisters induced him to lie upon his bed; he wished to lie on the ground like the poorest leper. "How good God is," he said, "to have preserved me long enough to have two priests by my side at my last moments, and also to have the good Sisters of Charity at the Leproserie." . . . "If I have any credit with God," were his dying words, "I will intercede for all in the Leproserie."

He died as if falling asleep. After death all marks of leprosy seemed to disappear, the wounds seemed healed. By his own request he was buried under the same good tree where for some nights he had slept when he first arrived in Molokai.

THE NEXT STORY OF GOLDEN DEEDS IS ON PAGE 2703.

NATURE'S WONDERFUL FOOD

CONTINUED FROM 2188

THERE is only one instance in which Nature has set out to make a food. The wheat plant grows and produces food material in its grain, not for the sake of the children of men, but for the sake of the children of wheat. The fish, the sheep, the chicken and the egg come into existence as part of the life of the living races to which they belong.

We find that throughout the whole of nature, with one exception, the animal and vegetable food of living creatures was first brought into being, not to be a food for us, but to live its own life. Only once has Nature set out to make a food—a substance brought into being only in order to be a food.

We may reasonably expect that this food will be good, that it will contain everything necessary for life, and that it will contain these things in the exact proportions that are needed. That is precisely what we find. The one food Nature has specially made is milk, and milk is a perfect food.

There are as many kinds of milk as there are kinds of mammals. The word comes from *mamma,* which is the proper name for the udder of a cow. In each case the young creature has different needs. It may be a young whale, or a young antelope, or a young human being. These lead different lives in different surroundings and temperatures; they develop at different rates; and therefore the milk provided for them differs suitably in each one of these animals.

We find, for instance, that the milk of the goat contains much more fat than human milk or cow's milk—more than twice as much as human milk; that human milk contains more sugar than cow's milk or goat's milk; but that it is much poorer in salts. More than this, milk differs from week to week, or month to month, according to the needs of the young creature.

Nevertheless, the general needs of all life are really the same. Every kind of milk contains protein, sugar, fat and various salts, though the proportions of these differ. The milk we are to study here is cow's milk, simply because that is what we usually drink. The cow's milk, however, was made for the calf, for which it is a food perfect and complete. It is not so perfect for the human body, nor for grown-up human beings, nor even for grown-up cattle, as it contains more water than is quite convenient. Yet no one can name any other food that is so nearly perfect even for human beings. People can live on milk and recover health from it after the gravest disease without the help of anything else.

Milk and its products, especially cream, ought to be the staple diet of children. No baby could survive with-

out milk; and the needs of the small baby, as it grows older, do not change so quickly as some people suppose. The commonest mistake in the feeding of children in the second, third and fourth years is not giving them enough milk.

Nothing could be a greater mistake than to judge the value of foods by their stiffness and solidity. Some people undervalue milk simply because it is a fluid, but we do not suppose that a lump of sugar is lost when it is melted in a cup of tea or a glass of lemonade. We quite understand that the sugar is still there and that we are getting it. Now, milk is really made of various things just as solid as a lump of sugar, that have been melted in water simply for convenience. As soon as milk is swallowed, it is turned into solids, or is clotted, as we say. This is done by a ferment in the stomach.

THE THINGS THAT GIVE MILK ITS GREAT FOOD VALUE

When the milk clots it forms a curd, which consists of most of the protein of the milk and all the fat. The clear *whey* which is left contains the sugar, the salts and a small part of the protein of the milk. It follows from this that it is possible to live on whey. Though it is rather a thin kind of nourishment, it saves the life of many a baby who can use nothing else. But no one could possibly live on curd only. Let us consider for ourselves what it is that curd lacks that is necessary for life, and that whey, though it looks so poor compared with curd, contains. The particular protein in whey—without which it could not sustain life—is well known to all of us, for when we boil milk it slowly stiffens and forms the "skin" on the top. Some grown-up people and many children throw away this skin, but it is one of the valuable things in milk.

The sugar of milk is a special sugar which is not found anywhere else. It is less sweet than the sugar we put in tea, and has the beautiful property of being far less ready to be broken up by microbes than any other sugar. The invaluable salts of milk, upon which bones and teeth depend, always include the following elements: potassium, sodium, calcium, magnesium, iron, phosphorus and chlorine. The proportion of potassium is strikingly high, because that is specially required for the growth of muscle. As for the lime, or calcium, no other food except yolk of egg contains so much as milk.

ONE OF THE DANGERS OF THE USE OF MILK

Many foreign or poisonous substances pass out of the blood in the mother's milk. This is very important practically, because it applies to all kinds of milk. It means that some babies are injured because they get, in their mother's milk, alcohol which those mothers have drunk in some form or other, perhaps on the advice of ignorant doctors who think that alcohol makes good milk in the body. Also, all sorts of medicines pass in this way, and very often the best method of giving medicine to a baby is to give it to its mother.

Now, all this applies also to cows. If improper things are given to cows as part of their food, the cows are very likely to get rid of them in their milk. Every day in the year many babies suffer, and not a few die, because they are upset by drinking cow's milk containing improper substances which have been given to the cow.

Excitement and worry also affect the composition of milk, and every careful farmer knows that if he wants milk of good quality from his cows, he must not send them to be exhibited at shows, nor must he, for instance, allow a dog to get among them and frighten them. The making of milk is an act entirely under the control of the nervous system, and if the nervous system is thrown out of gear, the milk produced may be poisonous.

WHY PLENTY OF GOOD MILK IS A NECESSITY FOR CHILDREN

The great difficulty about cow's milk, not only in the case of babies but also in the case of many grown-ups, is this: when it clots in the stomach, the clot is dense and thick, and therefore difficult to digest. The calf has far stronger powers of digestion than we have. The remedy is to add to the milk a little limewater, and then the clot formed in the stomach is light and loose and flaky.

Cream contains most of the fat in milk, but it is a mistake to suppose that that is all. A good deal of the protein is caught up in the cream, and thus cream is a very highly concentrated and excellent food, though not a complete food. It is probable that there would be no such thing as rickets—which means bad teeth and crooked bones and many worse things—if all children could get enough cream, or even enough good milk.

Deficiency of cream in milk does not

always mean that the milk has been watered; for various breeds of cows give milk containing various proportions of cream. Jersey and Guernsey cows, for instance, give milk much richer in cream than Holstein cows. Poor feeding will also reduce the amount of cream contained in milk.

Failing cream, butter is excellent. It contains about 82 parts in a hundred of fat, or twice as much as cream. No other fat is so easily digested, and butter can hardly be too highly praised as a food. It is possible to make from animal and vegetable fats a substance which is nearly the same as butter. This is called oleomargarine, or butterine, or some such name. It contains about the same proportion of fat as butter, and keeps better.

Examining milk in a modern dairy.

Another product of milk is cheese, which, like butter, is made from milk through the action of microbes. Cheese is highly nutritious. A pound of ordinary cheese represents nearly the whole of the protein and most of the fat in a gallon of milk. Beef contains less than half as much nourishment as the same weight of cheese. Cheeses vary considerably in their proportion of food material. Cost has nothing to do with the food value. Where food and drink are concerned, it is always flavor that is paid for.

Big books have been written about milk and its products, and this is natural, as there is no other food that can compare with it. There is only one other point, however, which we have space for here, and that is the value of milk as a food for the nervous system. In this respect milk has no rival. The food that comes nearest to it is eggs. We can understand the place of these two things as food for nerves if we understand that from what is in the egg, aided only by heat and oxygen, the brain of the chicken is actually made; while milk is the food prepared for the development of the brain in all those animals that have the highest brains. The health of the whole body depends on the brain. Thus we should expect milk to be specially designed for the benefit of brain-tissue, and that is what we find. For brain-workers and for nervous people who suffer from sleeplessness and tiredness there are no foods like milk and cream. Nothing makes good red blood like white milk, different though their colors be. What makes blood red is iron, and milk is the one food that contains iron in absolutely perfect form for the body to use.

The life and power of all the higher animals, which we call mammals, depend on milk. In fact, we make this fact the division between higher and lower animals. We call the former mammals because the young live on milk.

Milk is of the least importance and is used for the shortest time among the lowest mammalian animals, which live in Australia, but as we ascend through the Mammalian Order we find that the importance of milk increases, steadily and regularly, along the line of real progress; and this means, of course, that the importance of *motherhood* increases.

The higher in the scale of development, the longer the young animal is dependent upon its mother. Among human beings the period of dependence of the young upon their mothers is the longest of all. Nature makes more demands upon the human mother if the child is to survive—that is to say, if the human race is to continue—than she does upon any other mother. The human being is at birth more helpless, and this complete helplessness is longer continued than in any other case. Now, milk is the outward and visible expression of a greater thing still, which is motherhood. The lesson we have to learn, which all our politicians

and those who rule nations have yet to learn, is that by the laws of nature the importance and needs of motherhood increase as life ascends, and that upon it depends the destiny of all living races.

ONE OF THE MOST ASTONISHING FACTS THAT MEN KNOW

We have already learned that at bottom the needs of living matter are everywhere the same. Nature's perfect food for a human baby also suits even the living creatures standing at the other extreme of life—the microbes. This is so, and, indeed, all the substances on which microbes can conveniently be grown are foods of one kind or another, and none of them is better than milk. Those who cultivate microbes for study avail themselves of this fact, but it has a very serious side.

All milk contains microbes—not as single spies, but in battalions. If the milk has been boiled or treated in various ways, whether by heat or by chemicals, the microbes will be dead; but in any case they are there. It is one of the most astonishing facts that a sort of working arrangement has been made between the human body and a particular kind of microbe which lives in milk. This microbe lives on milk-sugar, or lactose, and turns it into lactic acid—the acid of sour milk. This particular microbe lives naturally in our own bodies and is very useful there. When we are well it prevents the growth of microbes that would hurt us.

Many people now take sour milk every day, or actually get strains of this microbe from the druggist and add them to milk in order to preserve or to recover their health. This particular microbe is found in the air and on every solid object wherever cows are. It is to be found in the purest milk, and doubtless has been found in milk for ages past. During that long time we and it seem to have become adapted to each other. Thus, in course of time the purest milk will turn sour unless these microbes in it have been killed. Such milk is by no means bad for us; many people like it.

HOW TO GET PURE MILK AND HOW TO KEEP IT PURE

If cows are properly fed, so that no improper substances get into the milk, and if they are kept clean and have plenty of air and sunlight, so that they do not suffer from the terrible disease called tuberculosis, then we have the first conditions for good milk. This should be milked by clean hands into clean pails; the hair and clothes of the milker should be covered with clothing that has been boiled; and the cow herself should be looked after very carefully. In hot weather the milk should be cooled immediately, packed into bottles and sealed. No milk should ever be allowed to be exposed to the air. Few foods should be exposed, but milk least of all.

At present, owing to ignorance and carelessness, milk spreads tuberculosis in many parts of our country. Except where special attention is paid to the danger, much bad milk is sold. In the hottest time of the year it kills thousands of babies, and often spreads diseases such as typhoid fever, diphtheria and scarlet fever. These, however, are a mere trifle compared with the massacre caused by milk carrying tuberculosis from the cow to the human being, and by milk infected with other evil microbes which every summer kill babies like flies in many large cities in various parts of the world.

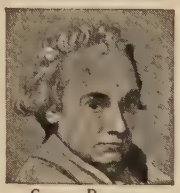
The health officials of some of our cities have strict rules about milk, and watch the supply closely. The people of these cities have milk which is quite safe to drink, even if it has come from farms more than a hundred miles away. Clean milk, if it is cooled immediately after it comes from the cow, and is then kept cold, will remain sweet for some time. Pasteurized milk will keep sweet longer. On the other hand, in many places there are no laws requiring that milk be kept clean, and no inspection of the cows is required. As a result, much of the milk sold in our towns and in some cities is really poison and not food.

THE DANGERS THAT CAN BE STOPPED, AND MUST BE STOPPED

This can be stopped as soon as those who vote for men to make the laws and those who make the laws begin to care about human life. It is certain that in order to stop it milk must become dearer, reckoning in money, not in life—for milk that kills scores of thousands of people every year is dear enough. It almost seems as if the fathers of children would have to spend, say, five cents a day more in order that their children should be fed on pure milk. That is one of the things that must be done before we can claim to be really civilized.

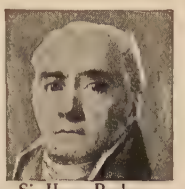
THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 2423.

Sir Thomas Lawrence.


George Romney.

John Constable.

Thomas Gainsborough.


Sir Henry Raeburn.

J. M. W. Turner.

GREAT BRITISH PAINTERS

CONTINUED FROM 2197

DURING the eighteenth century there lived and worked a group of men who lifted the name of England high in the world of art. They are Constable, Reynolds, Gainsborough, Hogarth, Turner, Lawrence, Romney and Raeburn. Let us look at this distinguished company of British artists.

William Hogarth belongs more truly to London than does any other English artist of great fame. He was born in November, 1697, in Bartholomew Close, near the fine old Norman church where he was baptized. A few doors away, Milton had stayed in hiding during the Restoration of the Stuarts. In the same group of houses, a little later, young Benjamin Franklin lived while he was working for a printer who had set up his press in the Lady Chapel of St. Bartholomew's Church close at hand.

Hogarth's father was a man of varied pursuits, now schoolmaster, now printer's reader, now author. His changing work took him about here and there in London. William was removed from school early and apprenticed to a silver-plate engraver.

From the first the boy's greatest diversion had been to watch people's faces. He would make sketches of features on any scrap of paper, and when that failed, on his thumbnail. In his day there were plenty of unpleasant things to be seen in London. Hogarth was among the crowd who saw the heads of the traitors of the 1745 Jacobite rising stuck high on Temple Bar. And he saw a man set up a telescope and point it toward Temple Bar; whereupon it was surrounded by a crowd who paid a halfpenny apiece to have a look through it. Hogarth watched their faces.

When he was twenty-one his apprenticeship came to an end and he began to work on his own account, engraving on metal, later making engravings for booksellers. He took drawing lessons in the St. Martin's Lane Academy, whose head was Sir James Thornhill, the painter of some of the pictures of the dome of St. Paul's.

Hogarth was an insignificant little figure, small, not very good-looking. But all who had seen his sketches were interested in him. One of the writers of the time tells how two artists were walking together when one exclaimed: "There! There's Hogarth!" "What," exclaimed the other, "that little man in the sky-blue coat?" Off he ran, curious to see William more closely. When he turned the corner of the alley he saw Hogarth trying to coax one of two quarreling boys to return to the fight.

HOGARTH'S ROMANTIC MARRIAGE WITH HIS MASTER'S DAUGHTER

In 1729 the world of art in London was startled by the news that Hogarth had made a runaway match with Jane, the only daughter of Sir James Thornhill. Sir James was furious. He shut his mouth tight, and his heart, and his purse. Presently, upon seeing some of the artist's admirable work, he was reconciled. It was a pity he did not live long enough to see "that little Hogarth" famous.

In the meantime the artist's poor days were past. He had a fine house, with a sign that he had made for himself of pieces of cork glued together and painted, fashioning "The Golden Head." And there was a brass plate on the door with the name of Hogarth on it.

William became as famous for his bitter tongue as for his satirical drawings. Horace Walpole went to see him one day about a history of painting. He cut the interview short by walking out of the house. "If I had stayed," Walpole afterward remarked, "there remained nothing for him but to bite me."

THE MEETING OF ARTISTS WHICH GREW INTO THE ROYAL ACADEMY

If Hogarth had enemies he had also plenty of friends, including famous men like Dr. Johnson and Samuel Richardson. He had enough work during the day, when he was not visiting his friends or arguing, and at night people would see him taking his walk in Leicester Fields, a queer, strutting little figure in a scarlet cape and cocked hat.

In later life Hogarth became interested in a Foundling Hospital. He summoned a number of fellow-artists, and they began the work of decorating the walls of its new building free of charge.

The artists made a committee among themselves and arranged to meet every year on November 5. This committee meeting soon became a great annual dinner attended by artists and connoisseurs. Fashionable people used to visit the Foundling Hospital to see the pictures. Presently the artists arranged an annual exhibition of their work. From this grew the Society of English Artists, which developed into the Royal Academy.

In the meantime Hogarth was growing old. He had a country house in Chiswick as well as his town house. He would have been pleased—Hogarth never thought poorly of himself—had he known that one hundred and fifty years later people would travel to see his country home and walk down Hogarth Lane, Chiswick. He died in October, 1764.

JOHN CONSTABLE, THE MILLER WHO BECAME A PAINTER OF LANDSCAPES

Within a generation after Hogarth's death a boy was growing up in the country who was destined to bear as famous a title—young John Constable. John's father was a well-to-do miller and owner of land in the south border of Suffolk. His house was in the delightful village of East Bergholt, and there John was born in June, 1776.

John was at school till he was seventeen, studying part of the time with a delightful old clergyman, who, when the boy lost himself in drawing, exclaimed: "Ah! I see you are in your painting room again." The lad's best friend in those early years was the only one in Bergholt who really had a feeling for art or understanding of it, and that was the village plumber. He dabbled in landscape-painting, and John in his spare hours painted in the fields with him.

The boy's father wished him to become a clergyman, but he gave up that idea as time went by, and took his son into the mill with him. John made a fine figure in his miller's coat—tall, handsome and dark-eyed.

His spare time was still spent with his friend the plumber-painter, and in painting in a small room he had hired in the village. When the young man was nineteen a nobleman visiting the neighborhood saw and admired his attempts at art. Thus encouraged, Mr. Constable allowed John to go to London to see if any luck lay in an artist's career. For some little time John's work was divided between East Bergholt and the capital.

When he was twenty-four he was admitted as a student of the Royal Academy. John's life in London was very much like that of any other artist who so far had not "arrived." He made pleasant friends, like Wilkie and Jackson, Stothard, and, later, Turner and Lawrence. He worked earnestly and tried hard to economize his resources. He was not extravagant, but he never had the knack of saying no to a borrower, and he never could resist a book he wanted. The result was that his money affairs were hard to keep in con-

THREE ARTISTS AT THEIR WORK

Sir Thomas Lawrence as a Boy.—From the painting by Margaret Dicksee.

Hogarth's portrait of himself.

George Morland as he was.

trol. Like Samuel Pepys, the diarist, he was always making little resolutions and then forgetting them.

CONSTABLE'S PICTURES EXHIBITED IN FRANCE WIN HONORS THERE

Many years passed, their happiness checkered by periods of ill-health, by disappointment about his work, and by the course of a true love affair which naturally did not run smooth. After five years of secret and difficult courtship, in 1816 John was able to marry the lady—Maria Bicknell, the granddaughter of the rector of East Bergholt. They were very happy together and had a family of seven children, to whom their father was devotedly attached.

Three years after his marriage John became Associate of the Royal Academy. Ten more years had to elapse before he became a member. They were filled with the ordinary incidents of a pleasant life and concentrated work, which seemed of little interest save to those concerned. The most important outward events were the exhibitions of Constable's work in France and the gold medal consequently given to the artist by the French king.

Soon after the death of his wife, Constable himself died, in 1837, in the midst of the English springtime he had always loved.

THE EARLY YEARS OF STRUGGLE OF A FAMOUS ARTIST OF SCOTLAND

One of the men who share the honors of this period was a Scotsman, Henry Raeburn. He was the son of a manufacturer who, in turn, was descended from border folk. Henry was born in a pretty suburb divided by sunny braes from Edinburgh, on March 4, 1756. He and his brother William were left orphaned and poor in Henry's early childhood, and it appeared that a hard life lay before them. William, twelve years older, looked after Henry for some time. Then a good woman, Sarah Sandilands, sent him to Heriot's Hospital, or school, an institution in Edinburgh where orphaned children were educated.

Sarah died long before the lad came to manhood. But her kindness and faith were justified, and it happened that her own granddaughter was one of those present when the "charity boy" was knighted at Edinburgh in 1822.

Henry was well educated at Heriot's in good manners as well as good scholarship. In 1771, the year Sir Walter Scott was born, Raeburn, then fifteen, left the school and was apprenticed to a goldsmith in Edinburgh. The boy had a certain amount of designing to do for his master, who was jeweler as well as goldsmith, and his taste in drawing was thus encouraged and trained. He contrived to have a few elementary lessons in "pencilling," and probably had his ambition roused by the sight of miniatures which passed through his master's hands.

He was a boy of very fine intelligence that was waiting, it would seem, for the first outside gleam to set it aglow. He spent his spare time in drawing; then he managed to buy some water colors and soon was painting miniatures himself. The years of his apprenticeship passed in close and steady industry. Before they were over, his work as a goldsmith was receding into the background and he was becoming known as a promising, self-taught artist.

YOUNG HENRY RAEBURN AND HIS LOVE OF THE OPEN AIR

A good friend now appeared in Henry's life, a portrait-painter called David Martin. Raeburn was introduced to this artist by his master the goldsmith, and dreams ran lazily in his head as he sat in Martin's studio and saw the pictures on the easels and about the walls. Henry copied a little of Martin's work, did portraits himself, and presently the young artist contrived to make a meagre living by painting. Three years passed thus.

Raeburn was now a striking figure. He was well over six feet tall, and had the strong, striking face that generally marks the man who is self-made and has known what it is to fight. He did not spend all his time indoors. In spite of hard work he contrived to become an excellent archer and fisherman, and a good golfer. Everything interested him, from science and shipbuilding to architecture.

As his work in portraiture carried him into the houses of wealthy and cultured people, he became favored by society, liked for his simplicity, his lack of affectation, and the good manners learned partly in Heriot's school and partly in his own heart, where true courtesy lives.

In 1778 an idyl strayed into his life. The story is that Raeburn was sketching a landscape outside Edinburgh when a lovely lady walked into the scene. He put her into his drawing "like a sunbeam

in a shadowed dell." The lovely lady, who was the Countess Leslie, presently stood on his studio doorstep and asked to have her portrait painted. She was small, "plump but graceful, with soft, confiding eyes." The painter fell in love with her, and made an extremely good portrait. In two months the two were married. The idyl came home to stay.

It was a happy married life. There was money; children came; Raeburn, no longer troubled by poverty, went on with his work. After a few years he became dissatisfied with his technique, packed up and went to Rome. There he stayed for two years, studying and working hard.

SIR HENRY RAEBURN AND HIS CONTEMPORARY, THOMAS GAINSBOROUGH

When he returned to Edinburgh he took a studio and settled down to paint portraits again. Presently he found the studio inadequate, and, turning architect, he set up one himself. The building is now called Raeburn House. With a short interval in London, the artist worked here the rest of his uneventful life.

Before he laid down his brush he had painted everybody of note in his generation; Sir Walter Scott several times. He thus became a chronicler of Edinburgh's intimate history. In 1814 he was made A.R.A. (Associate of the Royal Academy), the next year R.A. (Royal Academician). A little later he was made a knight. The year after, Raeburn was appointed the king's "limner and painter in Scotland, with all fees, profits, salaries, rights, privileges, and advantages thereto belonging." This quaint honor came too late for Raeburn to enjoy it. A few months later, in July, 1823, he died.

THE STORY OF HOW GAINSBOROUGH PAINTED HIS FIRST PORTRAIT

As Raeburn alone would have made Scotland famous for his portraiture, so Gainsborough alone would have made England famous.

Thomas Gainsborough was born at Sudbury in May, 1727, and the street where the house of his birth stood is now called Gainsborough Street in his honor. Thomas was the youngest of the nine children of John Gainsborough, a wool merchant. His uncle Humphrey was the master of Sudbury Grammar School, and there Tom, aged ten, went unwillingly to learn his lessons.

All his spare time, and a good many truant hours, were spent drawing trees and hedges in the lovely Sudbury district. His first portrait, while still a schoolboy, was that of a man who was planning to rob a pear tree. Thomas was sketching the trees, when, looking up, he saw above the fence a man's face staring longingly at the fruit. The boy-artist, unseen by the would-be thief, drew a picture of the face, and this sketch of Tom Peartree went down to posterity as the earliest portrait by the greatest portrait-painter of England.

When Thomas was fifteen his good father sent him to London to study art at the St. Martin's Lane Academy, where Hogarth had had lessons. The head of the academy was Francis Hayman, formerly a scene-painter, who was the friend of all the actors and musicians of London. Tom became one of the circle, and he kept his love for music and the stage to the end. He worked about a year at the academy, tried being a portrait-painter on his own account in London for a while, then went home to Sudbury.

GAINSBOROUGH'S YOUTHFUL MARRIAGE AND HAPPY YEARS OF QUIET LIFE

Tom's next adventure was to get married in 1746 to beautiful Margaret Burr, the sister of one of his father's travelers. She had a little money and the two removed to Ipswich, then a charming, dreamy old town. Gainsborough took a comfortable little house whose rent was six pounds a year, and there he settled down very happily with his bride. He was twenty, Mrs. Gainsborough eighteen. They made a song and a pleasure of life, and Thomas managed to find purchasers for some of his pictures.

But unsatisfied by his small public, Gainsborough set up a copy of Tom Peartree just above his own fence, so that passers-by could see it and argue therefrom that a portrait-painter lived within. One of the passers-by happened to be Sir Philip Thicknesse, who immediately gave the artist a commission, and became a very good friend of Gainsborough until the two were separated, almost thirty years later, by a sad quarrel.

After fourteen years in Ipswich the Gainsboroughs and their two daughters removed to Bath, then a very gay, fashionable place. Here the artist's work prospered greatly. His price for a bust portrait was gradually raised from eight guineas to forty; for a full-length portrait it was a hundred.

The artist divided his time between painting and music. In a kind of frenzy of delight he took up first the violin, then the viol-de-gamba, then the harp, and then the lute, but he was too impatient to become greatly skilled in any instrument. Gainsborough had a generous share of the artistic temperament and possessed, besides, a quick temper. It was largely owing to the very sweet disposition of his wife Peggy that his married life was a happy one. He was a strange mixture of light-hearted gaiety and sombre dreaminess.

THE GREAT DAYS WHEN GAINSBOROUGH WAS SOUGHT OUT BY KINGS

In 1774 the artist and his family moved to London, and lived in Schomberg House in Pall Mall. He had advanced far beyond the little house at Ipswich. He was now a great person, sought out by kings and princes. Yet he loved to go back to his old woods and streams. Not often does fortune come home thus to stay in the house of a genius. After a happy old age, blessed with troops of friends, Gainsborough died in August, 1788, loving art to the close. Just before the end he sent for Sir Joshua Reynolds, and the rivals parted friends. "We are all going to heaven," said Gainsborough into the deaf old artist's ear-trumpet, "and Van Dyck is of the company."

Sir Joshua Reynolds was a figure that stamped the art history of his generation. He was a Devonshire man, born at Plympton in July, 1723, the seventh son of a clergyman who was master of the Plympton Grammar School. Joshua went to his father's school with the rest, but in 1740 he was sent to London to study art. Hudson, the portrait-painter, was his master. Seven years later Joshua left London and settled at Devonport. There he became friendly with Commodore Keppel, and in 1749, when Keppel was in charge of a Mediterranean squadron, the young artist was invited to go abroad with him.

THE NEW FIGURE IN THE FASHIONABLE WORLD OF LONDON

Presently he arrived in Rome and stayed there three years, receiving his true art education. There also a sad misfortune befell him—an incurable deafness, the result of a severe chill which he got in the damp art galleries. He came home by way of Paris, settled in London and began portrait-painting. Presently the fashionable world of the capital became aware that a new power was among them—a smallish, roundish man, with red cheeks and blunt features, who painted portraits uncommonly well and gave the most indifferent face a distinction.

Before ten years passed he had become a very important person, and his studio was one of the chief centres of artistic and literary life in London. Reynolds never married. He had a great many friends, mostly writers and actors, and in 1764 he founded, with Dr. Johnson, the Literary Club—at the Turk's Head. Its members were men who gave greatness to the century—men like Sheridan, Garrick, Burke, Boswell and Goldsmith.

Reynolds thoroughly appreciated his grandeur. He presently had a coach of his own with carved and gilded wheels, and panels painted with pictures of the four seasons. He was very earnest in his work and took any opposition seriously, so that a good many "tiffs" with men like Walpole and his fellow-artists checkered his career. Still, he was considered the most important artist in London, and it was natural that when the Royal Academy was founded, in 1768, he should be its first president. It was also natural that the next year should see him knighted.

AN IMMORTAL WORKMAN LAYS DOWN HIS TOOLS

A few years later, in 1773, on a visit to Plympton, he was elected mayor of his native town and managed to perform his duties without any disadvantage to his work. By this time he was known as a man of literary attainments—his famous Discourses on Art, delivered to the students of the Academy, are still read and quoted. He also wrote interesting articles on the painting of other lands.

The year 1784 saw Reynolds further honored: he became painter to the king. But his work was coming to an end. A few seasons later his eyesight failed and he laid down his brushes. Serious and argumentative to the end, he carried on a quarrel with the Academy, but his life's work of inestimable importance was done. He died in February, 1792, and was buried with all dignity in St. Paul's Cathedral.

THE SMALL WOODEN FIGURES YOUNG GEORGE ROMNEY CARVED

Reynolds' greatest rivals were Gainsborough and Romney. At one time the latter caused Sir Joshua some anxious thoughts, as it seemed that the younger man was taking away his security.

A FAMOUS ARTIST'S FAMOUS FRIENDS

DR. JOHNSON VISITING SIR JOSHUA REYNOLDS IN THE ARTIST'S STUDIO

THE DYING GAINSBOROUGH SENDS FOR SIR JOSHUA REYNOLDS TO COMFORT HIM

The upper picture is by Mr. Francis Barraud; the lower picture is in the Mappin Art Gallery, Sheffield.

George Romney was born in December, 1734. He was the son of a joiner and cabinet-maker, and after a very short and inadequate schooling he was taken into his father's workshop. There was little money to spare in the family of nine sons and one daughter. George showed the first signs of his gifts in carving little wooden figures. While he was still only a youth he came across an illustrated edition of Leonardo da Vinci's Treatise on Painting. From that hour George's ambition was alive.

There was living in Kendal at the time a young artist called Steele, and when Romney was twenty-one he contrived to get himself articled to the painter. He was to work four years with Steele and to pay him twenty pounds a year.

THE HUMBLE BEGINNING OF ROMNEY'S ROAD TO FAME

But before the first year was well over, Steele, an adventurer, had disappeared. The next year George married a pretty and sweet-natured girl called Mary Abbott, and set up as a painter in Kendal. He began humbly, painting sign-boards and taking any commission that came. But his distinct art as a portrait-painter soon became known, and many people in Westmorland came to give him orders.

All this time Romney, who was by nature romantic and a wanderer impatient of any tie, had been dreaming of that paradise of British artists—London. As soon as he had enough money he divided it with his young wife, and, leaving her and their two children, went south. That was in 1762. Sweet Mary Abbott had need then of her good nature and her "stiff backbone," for she was deserted by her husband for thirty years.

During that time he lived in London, France, Italy, then London again. He was hard-working to a degree, and made enormous sums of money as he became more and more famous. Twice in the course of his prosperous years he visited his wife and children, but few of his friends knew that he was married. He did not allow his family to suffer from poverty, however, and contributed to the education of his son, who sometimes visited him and later wrote his life story. His spendthrift brothers, too, had his help.

For a time he gave most of his thought to painting pictures of a beautiful young woman—"the divine lady," as he called her. This was Emma Hart, who afterward became Lady Hamilton.

When he was about sixty Romney's health failed; he became a prey to melancholy which threatened madness. Most of his friends were gone: a lonely old age lay before him. Broken in spirit, he returned home at last to Kendal, and was nursed faithfully through the remaining months of his life by his good wife Mary.

THE POOR GENIUS WHO GALLOPED ALONG THE ROAD TO RUIN

A young man was living in London, known to Romney during the latter half of his life, whose pictures are very dear to the English public—George Morland. He was born in London in 1763, and was carefully brought up. His father was a crayonist and trained his son almost altogether himself.

The years of this artist's youth were strenuous. The boy drew astonishingly well before he was ten years old, and his father soon kept him very busy copying pictures by Dutch and English artists, in order to sell the copies. George resolved to be his own master some day. Romney offered to take him into his studio at a salary of £300, but the young painter determined not to be bound again in any way. As soon as he was free he fell headlong into a most disorderly and unfortunate way of life. While he was still young he became a confirmed drunkard. He was extremely eccentric, and given to the wildest freaks by way of amusement. At the same time his power of work was considerable, and after his marriage with Anne Ward he was soon able to maintain a household that was large, even if it was like a bear-garden.

As the years went on he became more and more a spendthrift. The result was bankruptcy and the debtor's prison—a sorry tale of a wasted life. He did not walk to ruin: he galloped there. His wife, although she truly loved him, had had to leave him. His health, of course, was soon gone. It was a most lamentable end to a gifted life—a life that, in spite of itself, had been to some purpose, for during his last eight years alone Morland painted over nine hundred pictures and did over a thousand drawings. He died in unhappy circumstances in October, 1804, to be followed very shortly by his heartbroken wife.

His life spent in the atmosphere of the race-track and the stable yard had given

him an intimate knowledge of all sorts of animals, of which he was very fond. His pictures of horses, donkeys, pigs and other beasts sold as fast as he could make them. But he was at the mercy of pawnshop keepers and dishonest dealers. The best of his stable scenes and pictures of country life are prized to-day for their artistic qualities, as well as for their value as faithful records of the England of the past.

Contemporary with poor George Morland was another painter of a very different character, Sir Thomas Lawrence, who lived from 1769 to 1830. He had a strange childhood. His father was a man who had studied to be a lawyer, had become an actor, then an innkeeper. Tom was born at the White Hart Inn, Bristol. When he was a little boy his parents moved to the Black Bear, Devizes. He was an unusually clever child, with a trick of remembering poetry and a natural art in reciting it. When he was only five years old his father used to put him on the table and make him recite. Then Tommy was given a pencil or a piece of chalk and told to show how cleverly he could draw.

Sir Joshua Reynolds' portrait of himself as a young man.

The innkeeper moved about from one place to another, and Tom went on drawing with his chalks. He was thought a kind of marvel, and people went to have their portraits done in pencil by this ten-year-old boy. He was a clever, handsome boy, but studious and not at all conceited. His habit of serious application, added to his gifts as a painter, naturally brought success. Fortune also helped him. When he was twenty-one, and in London, he painted what was considered the "picture of the year." From that time his career was assured. By special favor the Academy set aside rules and made him an associate, in spite of his youth. The great painters Gainsborough, Reynolds and Romney were dead. On Lawrence, then, fell the favors of the capital and the court. He succeeded Reynolds as painter to the king; he soon became a full Royal Academician; and he was sought by the rulers and the great of foreign lands.

THE INNKEEPER'S SON AND THE BARBER'S SON WHO SLEEP IN ST. PAUL'S

This unusual success would have been a test for the staunchest character. By degrees Lawrence got spoiled. He never ceased working hard and earning an excellent income, but his tastes changed. He wished to be grand. He changed his rooms in Old Bond Street for a fine house in Piccadilly. Later he moved into Soho, then into Russell Square. He was knighted in 1815, and when he died in 1830 the innkeeper's son was buried in St. Paul's Cathedral. Twenty-one years later a barber's son was buried there.

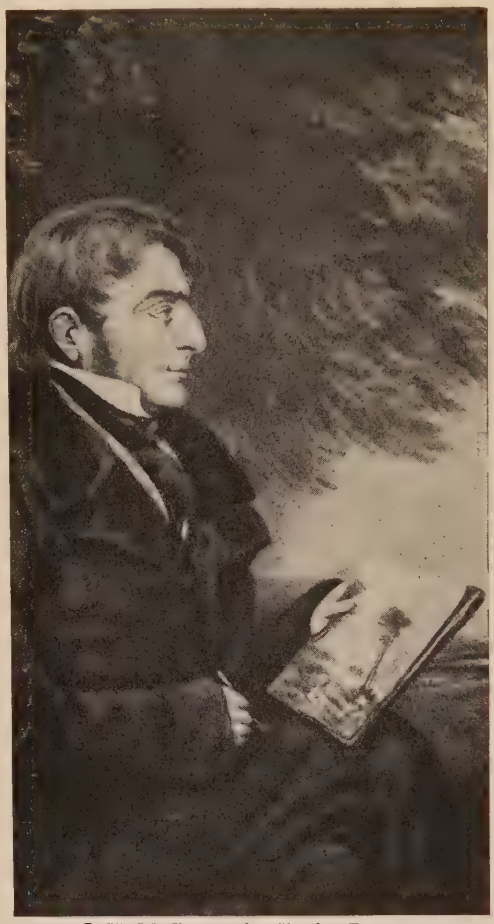
This was Joseph Mallord William Turner—by some said to have been born in Maiden Lane, Strand; by others, including Turner himself, at Barnstaple. He was born in 1775 and his childhood was passed in the Maiden Lane house. The boy's father, like Lawrence's, was proud of the skill he soon showed in drawing, bought him paints and brushes, and showed his work to his customers, saying delightedly, "William is going to be a painter."

William got no education save the barest rudiments, but he had a drawing in the Academy when he was fifteen. From boyhood days onward he was a tireless worker. He colored prints for an engraver, worked for an architect, exhibited year by year at the Academy, and presently made a public for himself. He was essentially a self-made artist.

THE GENIUS THAT LAY HID IN THE ODD LITTLE FIGURE OF TURNER

The story of Turner's life is a curious tale of character. It had no great out-

ward happenings. Turner was Turner, and he worked. He had a most powerful ambition to excel; he had an inordinate desire to keep himself secret from the world. These two passions ruled his life. He never married. He was careful of money to the point of miserliness, a result, perhaps, of early poverty and his father's influence.



J. M. W. Turner, by Charles Turner.
Reproduced by courtesy of C. M. W. Turner and The Studio.

Nature had not been kind to him. He was short and stout, crooked-legged and red-faced. A strange figure he must have been, tramping about Europe with a knapsack on his back, making at least one drawing a day. But that uncouth exterior concealed great genius. The artist became a full member of the Academy in 1802.

Had he married and had children his character might have broadened, softened. As it was, he became more and more like a wonderful room with windows and doors kept continually bolted. Few ever saw inside that room of life. The friends in whose homes he found freedom to be his best self have given witness that he was light-hearted and gay among them, especially in the company of children. He was kind and devoted to those he loved, and kept his father always with him until the old man's death.

On several occasions in the exhibitions of the Academy he dimmed his own glory to keep others from disappointment—once, washing dull black across the sky of his picture so that Lawrence's, hanging next, would show more brilliantly; and once, taking down a picture of his own to make place for an unknown artist's work. But, for the most part, in his art he gave out the wealth that other people shed out in their lives, making the world beautiful with another kind of beauty.

Toward the end of his life Turner lived in Chelsea, near the river he loved, moving from lodging to lodging in order to keep his whereabouts hidden. When he was an old man, very wealthy, he changed his dwelling once more, finding cheap rooms that pleased him.

When the landlady wanted a reference, he showed her money. When she asked for his name, he muttered a bit and then said, "What is *your* name?" "Mrs. Booth," said the landlady. "Then call me Mr. Booth," was Turner's reply. The neighborhood, watching the odd little figure, presently dubbed him "Admiral." Long before that time he had been called the "Dutch Skipper."

THE WONDERFUL COLLECTION THAT TURNER LEFT TO THE NATION

Turner died in 1851, aged seventy-five. By an act of legacy he left his fortune of some £140,000 to found a home for distressed artists. But, in ignorance, he did not word the will properly. It was contested, and the money went to his cousins. His paintings and drawings he left to the nation on condition that they should be kept together in a "Turner" room. Thus he contrived that his name, hidden in his lifetime, should be forever known after his death. He had planned his pictures in connected groups and had refused large prices for some of them. When he did sell a canvas he felt as if parting with a child of his own.

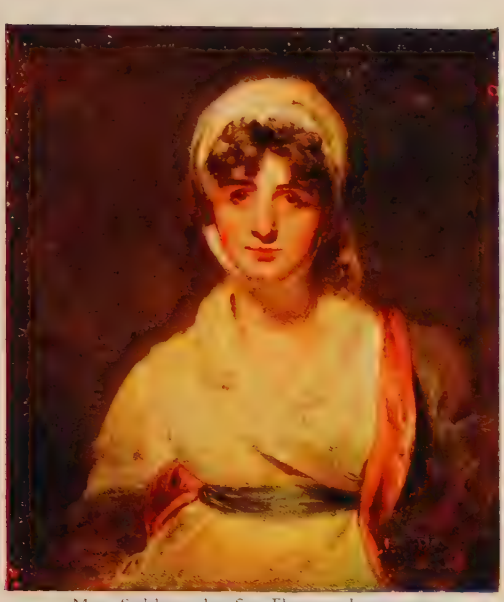
THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 2495.

GEORGE ROMNEY'S FINE PICTURE OF A LADY AND CHILD

The Countess of Oxford, by John Hoppner.

Lady Kerr, by George Romney.

Lady Cockburn and Her Children, by Sir Joshua Reynolds.



Mrs. Siddons, by Sir Thomas Lawrence.

Lord Newton, by Sir Henry Raeburn.

The Baillie Family, by Thomas Gainsborough.

The Age of Innocence, by Reynolds.

The Blue Boy, by Gainsborough.

Miss Bowles, by Reynolds.

The Painter's Daughters, by Thomas Gainsborough.

THE BABES IN THE WOOD

CONTINUED FROM 2228

ONCE upon a time two children lived in a big house on the border of a wood. Their parents, who loved them very dearly, were rich enough to buy them all the lovely things they longed for, and all day long they played in a beautiful garden, learning the songs of the birds and the secrets of the flowers. But one sad day their father and mother left them for a happier home in the skies, and the sister and brother were left alone.

The boy did his best to comfort his little sister; but they were sad days, and though they did not know it then, days that were sadder still were soon to come.

The children had an uncle whom they had never seen. He lived far away across the seas; but as soon as he learned of the death of his brother, the children's father, he hurried to their home. He knew that, now their father was dead, the children would have all his money, and the uncle also knew that if he could get rid of the children all this money would be his.

And the more he thought about this money the more he longed for it. And then a dreadful thought came into his head. He determined to kill the little innocent children and take their money.

So he hired two robbers, and paid them to take the children to a lonely spot in the wood and there kill them.

One morning when the sun shone brightly and all the birds were gay, the robbers crept into the garden where the children were playing and took them away. The robbers were big, rough men, and the children were afraid; but they were told that their uncle had sent them, and they dared not disobey. The men led them out of the garden into the wood, and on and on till they came to a deserted spot. They had come a long way, and the children were glad to rest. They sat down on the trunk of a tree while the robbers moved away and carried on a conversation in a low voice.

Presently they began to quarrel; their voices became loud and angry, and the children heard words that made them tremble with fear.

"I've been paid to kill them, and I shall earn my money," one of them was saying over and over again.

But the other robber seemed more kindly. "Why kill them?" he said. "Let us lose them, and perhaps someone may find them and give them shelter."

The little girl crept closer to her brother. "They want to kill us," she said, in a terrified whisper.

But before the boy could answer the kindly robber came forward and spoke to them. "Stay here while we go to find food and shelter for the night," he said in a gruff voice.

Then they went away, and the children were left all alone in the wood.

Too weary to go any farther, the children sat down under a friendly oak.

They dared not return to their wicked uncle, and they had no other home; so they wandered on, hand in hand, hoping to find shelter.

The forest was very beautiful, and for a time they were happy among the wild flowers and ferns; but soon the sun went down, the birds hushed their songs, and a great stillness came over all. Still the children toiled bravely on, tired, hungry and sad.

Presently the trees grew so thickly together that they could scarcely find their way, and at last the darkness of night came on and hid even the trees from sight. Too weary and frightened to go any farther, the children sat down under a friendly oak and fell asleep in one another's arms.

The birds of the forest peeped down from their nests above; the shy squirrels with their long tails glanced wonderingly at them; and the gentle wind shook the leaves so that they fell, making a cloak of crimson and gold to cover them.

And when morning came, a beautiful angel flew down and carried them away to their father and mother in the glorious world above.

THE KING OF THE GOLDEN RIVER

This is the second chapter of the fairy story by John Ruskin, which began on page 2221.

SOUTHWEST WIND LEAVES THE VALLEY

SOUTHWEST WIND, ESQUIRE, was as good as his word. He entered the Treasure Valley no more; and, what was worse, he had so much influence with his relations the West Winds in general, and used it so effectually, that they all adopted a similar line of conduct.

So no rain fell in the valley from one year's end to another. Though everything remained green and flourishing in the plains below, the inheritance of the three brothers was a desert. All their money was gone, and they had nothing left but some curious old-fashioned pieces of gold plate.

"Suppose we turn goldsmiths!" said Schwartz to Hans. "It is a good knave's trade. We can put a great deal of copper into the gold without anyone's finding it out."

The thought was agreed to be a very good one; they hired a furnace, and turned goldsmiths. But two slight circumstances affected their trade: the first, that people did not approve of the coppered gold; the second, that the two elder brothers, whenever they had sold anything, used to leave little Gluck to mind the furnace, and go and drink out the money in the ale-house next door.

So they melted all their gold without making money enough to buy more, and were at last reduced to one large drinking-mug which an uncle of his had given to little Gluck, and of which he was very fond and would not have parted with for the world, though he never drank anything out of it but milk-and-water. The mug was a very odd mug to look at. The handle was formed of two wreaths of flowing golden hair so finely spun that it looked more like silk than metal; and these wreaths descended into, and mixed with, a beard and whiskers of the same exquisite workmanship, which surrounded and decorated a very fierce little face, of the reddest gold imaginable, right in the front of the mug, with a pair of eyes in it which seemed to command its whole circumference. When it came to the mug's turn to be made into spoons, it half broke poor little Gluck's heart; but the brothers only laughed at him, tossed the mug into the melting-pot, and staggered out to the ale-house, leaving him to pour the gold into bars when it was all ready.

When they were gone, Gluck took a farewell look at his old friend in the melting-pot. He sauntered to the window, and saw the rocks of the mountain-tops all crimson and purple with the sunset; and the river, brighter than all, fell, in a waving column of pure gold, from precipice to precipice, with the double arch of a broad purple rainbow stretched across it.

"Ah," said Gluck aloud, after he had looked at it for a while, "if that river were really all gold, what a nice thing it would be!"

"No, it wouldn't, Gluck," said a clear voice, close at his ear.

"Bless me, what's that?" exclaimed Gluck, jumping up.

There was nobody there.

He looked into all the corners and

cupboards, and then began turning round and round as fast as he could in the middle of the room, thinking there was somebody behind him, when the same voice struck again on his ear.

It was singing now very merrily, "Lala-lira-la"; no words, only a soft melody, like a kettle on the boil. All at once it struck Gluck that it sounded louder near the furnace. He ran to the opening and looked in. Yes, he saw right; it seemed to be coming not only out of the furnace but out of the pot. He uncovered it, and ran back in a great fright, for the pot was certainly singing! He stood in the farthest corner of the room, with his hands up and his mouth open, for a minute or two, when the singing stopped, and the voice became clear.

"Hollo!" said the voice.

Gluck made no answer.

"Hollo! Gluck, my boy," said the pot again.

Gluck summoned all his energies, walked straight up to the crucible, drew it out of the furnace, and looked in. The gold was all melted, and its surface as smooth and polished as a river; but instead of reflecting little Gluck's head as he looked in, he saw, meeting his glance from beneath the gold, the red nose and sharp eyes of his old friend the mug, a thousand times redder and sharper than ever he had seen them in his life.

"Come, Gluck, my boy," said the voice out of the pot again; "I'm all right; pour me out."

But Gluck was too much astonished to do anything of the kind.

"Pour me out, I say," said the voice rather gruffly.

Still Gluck couldn't move.

"*Will* you pour me out?" said the voice passionately. "I'm too hot."

By a violent effort Gluck recovered the use of his limbs, took hold of the crucible and sloped it so as to pour out the gold. But instead of a liquid stream there came out, first, a pair of pretty little yellow legs, then some coat-tails, then a pair of arms, and finally the well-known head of his friend the mug; all which articles, uniting as they rolled out, stood up energetically on the floor in the shape of a little golden dwarf about a foot and a half high.

"That's right!" said the dwarf, stretching out first his legs and then his arms, and then shaking his head up and down and as far round as it would go for five minutes without stopping; apparently with the view of ascertaining if he were quite correctly put together, while Gluck stood contemplating him in speechless amazement.

He was dressed in a slashed doublet of spun gold, so fine in its texture that the colors gleamed over it as if on a surface of mother-of-pearl; and over this brilliant doublet his hair and beard fell full halfway to the ground in waving curls, so exquisitely delicate, that Gluck could hardly tell where they ended; they seemed to melt into air.

The dwarf turned his small sharp eyes full on Gluck and stared at him deliberately for a minute or two. This gave time for Gluck to collect his thoughts a little, and seeing no great reason to view his visitor with dread, he ventured on a question.

"Pray, sir," said Gluck, "were you my mug?"

On which the little man turned sharply round, walked straight up to Gluck, and drew himself up to his full height.

"I am the King of what you mortals call the Golden River. The shape you saw me in was owing to the malice of a stronger king, from whose enchantments you have freed me. What I have seen of you and your conduct to your wicked brothers renders me willing to serve you; therefore attend to what I tell you. Whoever shall climb to the top of that mountain from which you see the Golden River issue, and shall cast into the stream at its source three drops of holy water, for him, and for him only, the river shall turn to gold. But no one failing in his first can succeed in a second attempt; and if anyone shall cast unholy water into the river, it will overwhelm him and he will become a black stone."

So saying, the King of the Golden River turned away and deliberately walked into the centre of the hottest flame of the furnace. His figure became red, white, transparent, dazzling, a blaze of intense light—rose, trembled and disappeared. The King of the Golden River had evaporated.

"Oh!" cried poor Gluck, running to look up the chimney after him. "Oh, dear, dear, dear me! My mug! my mug! my mug!"

CHAPTER III

THE QUEST OF HANS, AND THE BLACK STONE

The King of the Golden River had hardly made his extraordinary exit before Hans and Schwartz came roaring into the house, very savagely drunk.

The discovery of the total loss of their last piece of plate had the effect of sobering them just enough to enable them to stand over Gluck beating him very steadily for a quarter of an hour; at the expiration of which period they dropped into a couple of chairs, and requested to know what he had got to say for himself. Gluck told them his story, of which, of course, they did not believe a word. They beat him again till their arms were tired, and staggered to bed. In the morning, however, the two brothers, after wrangling a long time on the knotty question which of them should try his fortune first, drew their swords and began fighting. The noise of the fray alarmed the neighbors, who sent for the constable.

Hans, on hearing this, contrived to escape, and hid himself; but Schwartz was taken before the magistrate, fined for breaking the peace, and, having drunk out his last penny the evening before, was thrown into prison till he should pay.

When Hans heard this, he was much delighted and determined to set out immediately for the Golden River. How to get the holy water was the question. He went to the priest, but the priest could not give any holy water to so abandoned a character. So Hans stole a cupful and returned home in triumph.

Next morning he got up before the sun rose, put the holy water into a strong flask, and two bottles of wine and some meat in a basket, slung them over his back, took his staff in his hands, and set out for the mountains.

It was, indeed, a morning that might have made anyone happy, even with no Golden River to seek for. Level lines of dewy mist lay stretched along the valley, out of which rose the massy mountains—their lower cliffs in pale gray shadow, hardly distinguishable from the floating vapor, but gradually ascending till they caught the sunlight, which ran in sharp touches of ruddy color along the angular crags, and pierced, in long level rays, through their fringes of spear-like pine. Far beyond, fainter than the morning cloud, but purer and changeless, slept, in the blue sky, the utmost peaks of eternal snow.

The Golden River was now nearly in shadow; all but the uppermost jets of spray, which rose like slow smoke above the undulating line of the cataract and floated away in feeble wreaths upon the morning wind.

On this object, and on this alone, Hans's eyes and thoughts were fixed; forgetting the distance he had to traverse, he set off at an imprudent rate of walking, which greatly exhausted him before he had scaled the first range of the green and low hills. He was, moreover, surprised, on surmounting them, to find that a large glacier, of whose existence he had been absolutely ignorant, lay between him and the source of the Golden River.

He entered on it with the boldness of a practiced mountaineer; yet he thought he had never traversed so strange or so dangerous a glacier in his life. The ice was excessively slippery, and out of all its chasms came wild sounds of gushing water. The ice crashed and yawned into fresh chasms at his feet, and tottering spires nodded around him and fell thundering across his path; and it was with terror that he leaped the last chasm, and flung himself, exhausted and shuddering, on the firm turf of the mountain.

His way now lay straight up a ridge of bare red rocks, without a blade of grass to ease the foot, or a projecting angle to afford an inch of shade from the south sun. It was past noon, and the rays beat intensely upon the steep path, while the whole atmosphere was motionless and penetrated with heat. Intense thirst was soon added to the bodily fatigue with which Hans was now afflicted; glance after glance he cast on the flask of water which hung at his belt.

"Three drops are enough," at last thought he; "I may at least cool my lips."

He opened the flask, and was raising it to his lips when his eye fell on an object lying on the rock beside him; he thought it moved. It was a small dog, apparently in the last agony of death from thirst. Its tongue was out, its jaws dry, and a swarm of black ants were crawling about its lips and throat. Its eye moved to the bottle which Hans held in his hand. He raised it, drank, spurned the animal with his foot, and passed on.

Hans saw a gray-haired old man extended on the rocks. "Water!" he cried feebly.

The path became steeper and more rugged every moment; and the high hill air, instead of refreshing him, seemed to throw him into a fever. The noise of the hill cataracts sounded like mockery in his ears; they were all distant, and his thirst increased every moment.

Another hour passed, and he again looked down to the flask at his side; it was half empty; but there was much more than three drops in it. He stopped to open it, and again, as he did so, something moved in the path above him. It was a fair child stretched nearly lifeless on the rock, its breast heaving with thirst, its eyes closed, and its lips parched and burning. Hans eyed it deliberately, drank, and passed on. And a dark, gray cloud came over the sun, and long, snake-like shadows crept up along the mountainsides.

Hans struggled on. The sun was sinking, but its descent seemed to bring no coolness; the leaden weight of the dead air pressed upon his brow and heart, but the goal was now near. He saw the cataract of the Golden River springing down from the hillside scarcely five hundred feet above him. He paused for a moment to breathe, and sprang on to complete his task.

At this instant a faint cry fell on his ear. He turned and saw a gray-haired old man extended on the rocks. His eyes were sunk, his features deadly pale and gathered into an expression of despair.

"Water!" He stretched his arms to Hans, and cried feebly: "Water! I am dying!"

"I have none," replied Hans. "Thou hast had thy share of life."

He strode over the prostrate body and darted on. And a flash of blue lightning rose out of the East shaped like a sword; it shook thrice over the whole heaven, and left it dark with one heavy, impenetrable shade. The sun was setting; it plunged toward the horizon like a red-hot ball.

The roar of the Golden River rose on Hans's ear. He stood at the brink of the chasm through which it ran. Its waves were filled with the red glory of the sunset; they shook their crests like tongues of fire, and flashes of bloody light gleamed along their foam. Their sound came mightier and mightier on his senses; his brain grew giddy with the prolonged thunder. Shuddering, he drew the flask from his girdle and hurled it into the centre of the torrent.

As he did so, an icy chill shot through his limbs; he staggered, shrieked and fell. The waters closed over his cry. And the moaning of the river rose wildly into the night, as it gushed over

THE BLACK STONE.

CHAPTER IV

THE QUEST OF SCHWARTZ AND WHAT BEFELL HIM

Poor little Gluck waited very anxiously alone in the house for Hans's return. Finding he did not come back, he was terribly frightened and went and told Schwartz in the prison all that had happened. Schwartz was pleased, and said that Hans must certainly have been turned into a black stone, and he should have all the gold to himself.

But Gluck was very sorry, and cried all night. When he got up in the morning, there was no bread in the house nor any money; so Gluck went and hired himself to another goldsmith, and he worked so hard, and so neatly, and so long every day, that he soon got money enough together to pay his brother's fine, and he gave it all to Schwartz, and Schwartz got out of prison. Then Schwartz was quite pleased and said he should have some of the gold of the river. But Gluck only begged he would go and see what had become of Hans.

Now when Schwartz had heard that Hans had stolen the holy water, he thought to himself that such a proceeding might not be considered altogether correct by the King of the Golden River, and determined to manage matters better. So he took some more of Gluck's money and went to a bad priest, who gave him some holy water very readily for it. Then Schwartz was sure it was all quite right. So Schwartz got up early in the morning before the sun rose, and took some bread and wine in a basket, and put his holy water in a flask, and set off for the mountains.

Little Gluck, frightened, went and told Schwartz in prison all that had happened.

Like his brother, he was much surprised at the sight of the glacier, and had great difficulty in crossing it even after leaving his basket behind him. The day was cloudless, but not bright; there was a heavy purple haze hanging over the sky, and the hills looked lowering and gloomy. And as Schwartz climbed

the steep rock path, the thirst came upon him until he lifted his flask to his lips to drink. Then he saw the fair child lying near him on the rocks, and it cried to him and moaned for water.

"Water, indeed!" said Schwartz. "I haven't half enough for myself," and passed on. And as he went he thought the sunbeams grew more dim, and he saw a low bank of black cloud rising out of the west; and, when he had climbed for another hour, the thirst overcame him again, and he would have drunk. Then he saw the old man lying before him on the path, and heard him cry out for water.

"Water, indeed!" said Schwartz. "I haven't half enough for myself." And on he went.

Then, again, the light seemed to fade from before his eyes, and he looked up, and, behold, a mist, of the color of blood, had come over the sun; and the bank of black cloud had risen very high, and its edges were tossing and tumbling like the waves of the angry sea. And they cast long shadows, which flickered over Schwartz's path.

A sudden horror came over Schwartz, he knew not why; but the thirst for gold prevailed over his fear, and he rushed on. And when Schwartz stood by the brink of the Golden River, its waves were black like thunder-clouds, but the foam was like fire; and the roar of the waters below and the thunder above met as he cast the flask into the stream.

And, as he did so, the lightning glared in his eyes, and the earth gave way beneath him, and the waters closed over his cry. And the moaning of the river rose wildly into the night, as it gushed over the

The priest gives Gluck some holy water.

CHAPTER V

GLUCK REACHES THE GOLDEN RIVER

When Gluck found that Schwartz did not come back, he was very sorry and did not know what to do. He had no money and was obliged to go and hire himself again to the goldsmith, who worked him very hard and gave him very little money.

So, after a month or two, Gluck grew tired, and made up his mind to go and try his fortune with the Golden River.

"The little king looked very kind," thought he. "I don't think he will turn me into a black stone."

So he went to the priest, and the priest gave him some holy water as soon as he asked for it. Then Gluck took some bread in his basket and the bottle of water, and set off very early for the mountains.

If the glacier had occasioned a great deal of fatigue to his brothers, it was twenty times worse for him, who was neither so strong nor so practiced on the mountains. He had several very bad falls, lost his basket and bread, and was very much frightened at the strange noises under the ice. He lay a long time to rest on the grass after he had got over, and began to climb the hill just in the hottest part of the day. When he had climbed for an hour, he got dreadfully thirsty and was going to drink, like his brothers, when he saw an old man coming down the path above him looking very feeble and leaning on a staff.

"My son," said the old man, "I am faint with thirst; give me some of that water."

Then Gluck looked at him, and when he saw that he was pale and weary, he gave him the water. "Only, pray, don't

drink it all!" said Gluck. But the old man drank a great deal, and gave him back the bottle two-thirds empty. Then he bade him good speed, and Gluck went on again merrily. And the path became easier to his feet, and two or three blades of grass appeared upon it, and some grasshoppers began singing on the bank beside it; and Gluck thought he had never heard such merry singing.

Then he went on for another hour, and the thirst increased on him so that he thought he should be forced to drink.

Gluck put the bottle to the child's lips and it drank it all but a few drops. Then it smiled on him, and got up and ran down the hill; and Gluck looked after it, till it became as small as a little star, and then turned and began climbing again. And then there were all kinds of sweet flowers growing on the rocks, bright green moss with pale pink starry flowers, and soft belled gentians, more blue than the sky at its deepest, and pure white transparent lilies. And crimson and purple butterflies darted hither and thither.

But, as he raised the flask, he saw a little child lying panting by the roadside, and it cried out piteously for water. Then Gluck struggled with himself and determined to bear the thirst a little longer; and he put the bottle to the child's lips, and it drank it all but a few drops.

Then it smiled on him, and got up, and ran down the hill; and Gluck looked after it till it became as small as a little star, and then turned and began climbing again. And then there were all kinds of sweet flowers growing on the rocks, bright green moss with pale pink starry flowers, and soft belled gentians more blue than the sky at its deepest, and pure white transparent lilies. And crimson and purple butterflies darted hither and thither, and the sky sent down such a pure light that Gluck had never felt so happy in his life.

Yet, when he had climbed for another hour, his thirst became intolerable again, and when he looked at his bottle he saw that there were only five or six drops left in it, and he could not venture to drink. And, as he was hanging the flask to his belt again, he saw a little dog lying on the rocks gasping for breath—just as Hans had seen it on the day of his ascent. And Gluck stopped and looked at it, and then at the Golden River not five hundred yards above him; and he thought of the dwarf's words, "that no one could succeed except in his first

attempt"; and he tried to pass the dog, but it whined piteously, and Gluck stopped again.

"Poor beastie," said Gluck, "it'll be dead when I come down again if I don't help it." Then he looked closer and closer at it, and its eye turned on him so mournfully that he could not stand it. "Confound the King and his gold, too!" said Gluck; and he opened his flask, and poured all the water into the dog's mouth.

The dog sprang up and stood on its hind legs. Its tail disappeared; its ears became long, longer, silky golden; its nose became very red; its eyes became very twinkling. In three seconds the dog was gone and before Gluck stood his old acquaintance the King of the Golden River.

"Thank you," said the monarch; "but don't be frightened, it's all right." For Gluck showed manifest symptoms of consternation at this unlooked-for reply to his last observation.

"Why didn't you come before," continued the dwarf, "instead of sending me those rascally brothers of yours for me to have the trouble of turning into stones? Very hard stones they make, too!"

"Oh, dear me!" said Gluck, "have you really been so cruel?"

"Cruel!" said the dwarf. "They poured unholy water into my stream; do you suppose I'm going to allow that?"

"Why," said Gluck, "I'm sure, sir—your Majesty, I mean—they got the water out of the church font."

"Very probably," replied the dwarf, "but"—and his countenance grew stern as he spoke—"the water which has been refused to the cry of the weary and dying is unholy, though it had been blessed by every saint in heaven; and the water which is found in the vessel of mercy is holy, though it had been defiled with corpses."

So saying, the dwarf stooped and plucked a lily that grew at his feet. On its white leaves there hung three drops of clear dew. And the dwarf shook them into the flask which Gluck held in his hand. "Cast these into the river," he said, "and descend on the other side of the mountains into the Treasure Valley. And so good speed!"

As he spoke, the figure of the dwarf became indistinct. The playing colors of his robe formed themselves into a mist of dewy light: he stood for an instant veiled with them as with the belt of a broad rainbow. The colors grew faint, the mist rose into the air; the monarch had evaporated.

And Gluck climbed to the brink of the Golden River, and its waves were as clear as crystal and as brilliant as the sun. And when he cast the three drops of dew into the stream, there opened where they fell a small circular whirlpool, into which the water descended with a musical noise.

Gluck stood watching it for some time, very much disappointed, because not only was the river not turned into gold, but its waters seemed much diminished in quantity. Yet he obeyed his friend the dwarf and descended the other side of the mountains, toward the Treasure Valley; and as he went he thought he heard the noise of water working its way under the ground. And when he came in sight of the Treasure Valley, behold, a river, like the Golden River, was springing from a new cleft of the rocks above it and was flowing in innumerable streams among the dry heaps of red sand.

And as Gluck gazed, fresh grass sprang beside the new streams, and creeping plants grew and climbed among the moistening soil. Young flowers opened suddenly along the riversides, as stars leap out when twilight is deepening, and thickets of myrtle and tendrils of vine cast lengthening shadows over the valley as they grew. And thus the Treasure Valley became a garden again, and the inheritance which had been lost by cruelty was regained by love.

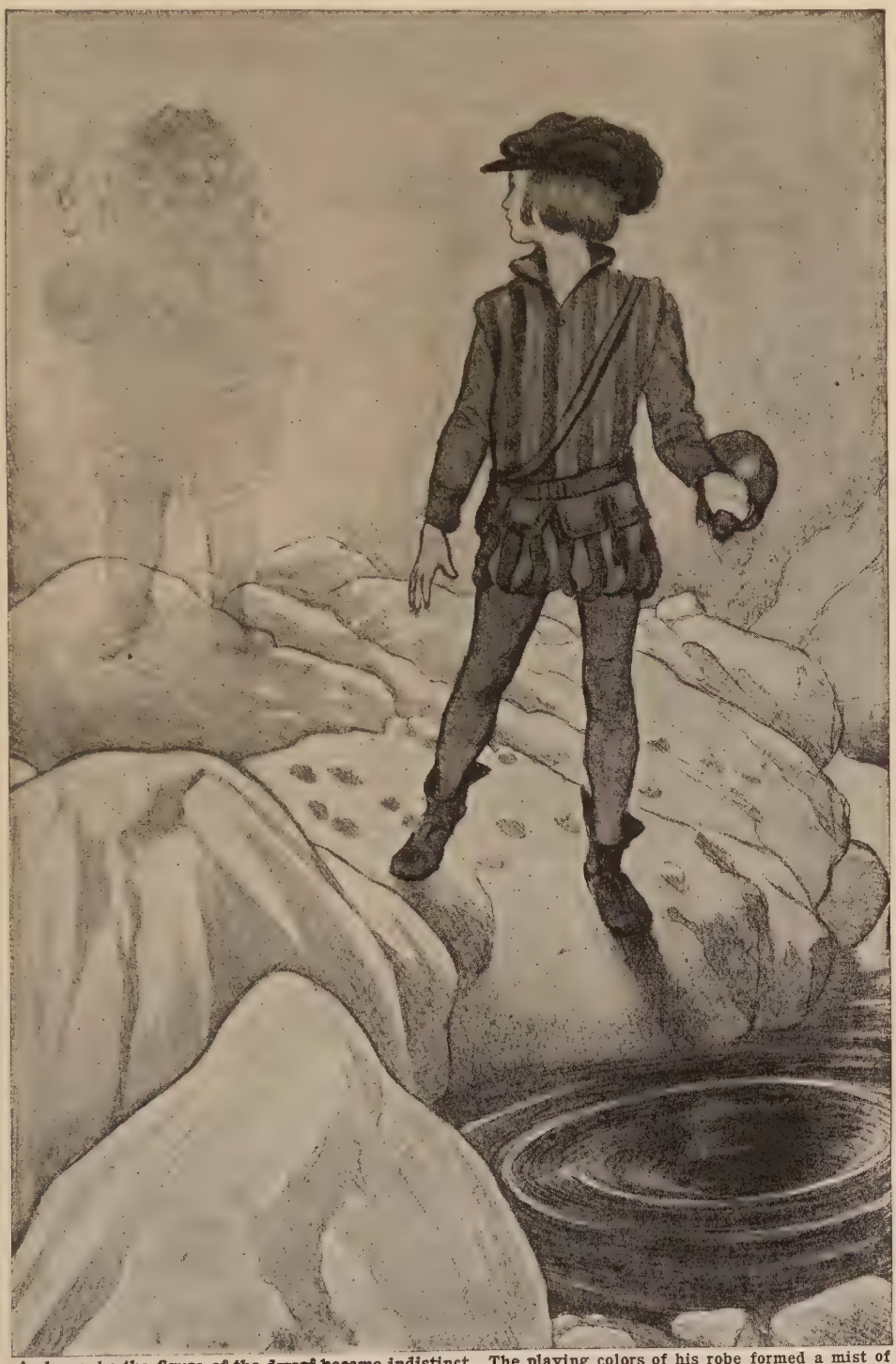
And Gluck went and dwelt in the valley, and the poor were never driven from his door; so that his barns became full of corn, and his house of treasure. And, for him, the river had, according to the promise, become a River of Gold.

And to this day the inhabitants of the valley point out the place where the three drops of holy dew were cast into the stream by little Gluck, and trace the course of the Golden River under the ground, until it emerges in the Treasure Valley.

And at the top of the cataract of the Golden River are still to be seen two black stones round which the waters howl mournfully every day at sunset; and these stones are still called by the people of the valley

THE BLACK BROTHERS.

THE DWARF FADES AWAY IN THE MIST



As he spoke the figure of the dwarf became indistinct. The playing colors of his robe formed a mist of dewy light: he stood for an instant veiled with them as with the belt of a broad rainbow. The colors grew faint, the mist rose: the monarch had evaporated. Then Gluck cast the drops into the stream.

THE HUNGRY FOX AND THE KITTEN

A VERY hungry fox was prowling one moonlight night about a farmhouse, and he met a little kitten.

"You're not much of a meal for a starving creature," he said. "But in these hard times something is always better than nothing."

"Oh, don't eat me!" said the kitten. "I know where the farmer keeps his cheeses. Come with me and see."

She led him into the farmyard, where there was a deep well with two buckets.

"Now, look in here, and you will see the cheeses," she said.

The fox peered down the well, and saw the moon reflected in the water.

"This is the way down," said the kitten, jumping into the top bucket. Round and round rattled the rope-wheel, and down went the kitten into the water. Happily, she had gone down before, and she knew what to do, and, getting out of the bucket, she clung on to the rope just above the water.

"Can't you bring up one of the cheeses?" said the fox.

"No, they are too heavy," said the kitten. "You must come down."

Now, the two buckets were connected, so that when one went down the other came up. As the fox was much heavier than his little companion, his bucket went down and the water drowned him, while the kitten came up and escaped.

THE PROUD KING OF KAMERA

THE negro king of Kamera, in Africa, was a proud, stern man, and his men feared him and instantly carried out his slightest wishes. But one day when he was boasting that all men were his servants, a wise old negro called Boukabar reproached him, saying: "All men are servants of one another."

"So I am your servant, am I?" said the king, in great anger. "Then prove it. Force me to work for you before sunset and I will give you a hundred cows. Fail, and I will kill you, and so show you that I am your master."

"Very well," said Boukabar.

Being a very old man, he had to use a stick in walking, and just as he took it up to go out, a beggar came to the door.

"Permit me," said Boukabar, "to give this poor man something to eat."

Taking some food in both hands, he tottered past the king, and his stick slipped from under his arm and got entangled in his dress, and nearly tripped him up. And he cried to the king: "Please pick up the stick, or I shall fall."

The king picked it up without thinking, and Boukabar then laughed merrily, and exclaimed: "You see all good men are servants of one another. I am waiting on the beggar, and you are waiting on me. But I do not want the cows. Give them to this poor man."

The king did so, and took Boukabar as his chief counselor, and Boukabar showed him how to rule his people well.

LOVE LAUGHS AT LOCKSMITHS

THIS was the device which the handsome young Marquis of Hautmont engraved on his shield when he came to Paris. Being as bold as he was handsome, he began to make love to Princess Marguerite, the king's daughter, and the king was annoyed at his boldness.

"They are loud words which you have taken for your device," said he, "but are they true? I will lock the princess up in a tower. If you can enter it within a month, you may marry her. If you fail, you must lose your life."

The marquis pretended to be discomfited. But he secretly ordered some woodcarvers to make a great hollow wooden nightingale. When the bird was finished and painted, the marquis got inside and played beautiful airs on a flute, while his servant drew it about the streets.

Everybody began to talk about the mechanical nightingale; the king came to see it, and Princess Marguerite asked for it to be brought to her. The king, thinking that the music was produced by machinery, had the bird carried into the tower, and the marquis then jumped out and kissed the princess's hand, saying:

"You see, sire, love laughs at locksmiths." And the king was forced to acknowledge that this was true; and as he saw that the marquis and the princess were in love with one another, he allowed them to marry on a really royal dowry.

THE NEXT STORIES ARE ON PAGE 2455.

Robert Southey.

Dorothy Wordsworth.

Samuel Taylor Coleridge.

WORDSWORTH AND HIS FRIENDS

CONTINUED FROM 2258

IN the nine years between 1798 and 1807 poems were published which, in subject, spirit and style, greatly widened the influence of English verse. That broadening change came from the views of poetry held by one man, and from his ideas of the relation between man and nature. That man was William Wordsworth.

Gleams of delight in the outdoor world had brightened English poetry for more than 400 years. They charm us in Chaucer, Shakespeare, Milton and in many of the lesser poets, such as Herrick and Marvell. Though they disappear when poetry leaves the country for the town under Dryden and Pope, we find them again in the work of Thomson and Gray, Cowper and Burns.

But it was Wordsworth who made a deep poetic appreciation of nature, closely akin to a religion, a great part of English literature. Love of nature was not just a decorative part of his verse: it was its chief impulse and subject.

Wordsworth, Coleridge and Southey were called in their own day the Lake poets, because they were friends and for some years lived near each other in the English Lake District in Cumberland. But it was only in their youth that they had a deep influence on each other. By the time he was thirty-two Coleridge had drifted away from the Lake Country, and Southey and Wordsworth were each deeply buried in his own literary concerns, though living in the lovely Lakeland to the end of their days.

Their early association, however, was romantic. Wordsworth was born at Cockermouth, in Cumberland, just outside the Lake District, on April 7, 1770. His father was the agent of the first Earl of Lonsdale, a wealthy but eccentric nobleman. William was only thirteen when his father died, leaving five children, one being a girl. The Wordsworth family would have been very fairly well off if the Earl of Lonsdale had paid them money he owed their father, but he would not do that, and they were brought up by their grandparents in a very plain and simple way.

Money was found, however, to educate them, so that the oldest boy, Richard, became a lawyer like his father, William and the youngest boy went to Cambridge, and the third son went to sea.

At college William Wordsworth was not one of the men who made distinction in learning his aim. His brother Christopher, on the other hand, became Master of Trinity. William, while still a student,

wandered through France, Switzerland and northern Italy, studying languages and admiring the scenery. After he had taken his degree he went to France again, drawn there partly by his deep interest in the desires of the French for freedom, which ended in the Revolution. Indeed, nearly all young men with eager, intellectual minds felt the same. Samuel Taylor Coleridge, a younger student at Cambridge, and Robert Southey, younger still, at Oxford, were thinking the same thoughts. As Wordsworth said, when sketching these years in The Prelude:

> Bliss was it in that dawn to be alive,
> But to be young was very heaven.

THE LONG LIFE WORDSWORTH LIVED WITH HIS GOOD SISTER DOROTHY

The view of these young enthusiasts was expressed by Wordsworth in the sentence: "In the people was my trust."

He stayed long enough in France to make some intimate acquaintances there, and to spend such money as had been left over from his education. When he returned he stayed a while in London, and published his first book of poems descriptive of his travels and of an evening walk in the Lake District. Though the sale of the book was small, it reached the young students Coleridge and Southey, still at college and unknown to the poet.

Returning to the Lake District, Wordsworth began the close association with his sister Dorothy that lasted all their lives. He was doubtful what he could do beyond writing the poems that came to him, but presently a friend left him a small legacy. That, with the tutorship of a little son of a college friend and Dorothy's careful management, enabled the brother and sister to settle for a time in the west of England. There, in 1795 or 1796, they met Coleridge, and began a brief but fruitful literary partnership in which it is quite possible that Dorothy Wordsworth played the most stimulating part.

HOW COLERIDGE FRITTERED AWAY HIS TIME AND HIS POWERFUL MIND

How Coleridge came to be there must now be told. Samuel Taylor Coleridge, son of a Devonshire clergyman, was born on October 21, 1772, educated at Christ's Hospital School in London (where Charles Lamb was a younger fellow-scholar) and at Cambridge. In Coleridge a powerful mind was yoked with an undecided and dependent character. He needed always the support of a constant friend. At Cambridge he frittered his time away and involved himself in such difficulties that to escape them he enlisted in a dragoon regiment as Silas Tomkyn Comberback, but was bought out and brought back.

On leaving Cambridge he wrote for the newspapers, preached as a Unitarian, lectured, and tried to start a newspaper of his own; but he did not get very far because he had no definite plan which would engage all his great but unbalanced abilities. Always, however, he had the power of convincing people who heard him talk that he was a man who might greatly bless mankind by his wisdom when it was fully developed and expressed. So, generous friends hastened to help him. A Somersetshire tanner named Poole provided him with a cheap house, and the Staffordshire potters, the Wedgwoods, gave him $750 a year to live on. A Bristol bookseller, Cottle, published a book of poems written jointly by him and Charles Lamb.

THE LITTLE CIRCLE OF YOUNG MEN WHO DREAMED DREAMS

Before this period, however, while he was still at Cambridge, he became acquainted with Robert Southey, then a young student at Oxford, a friend of Mr. Cottle and member of a circle of young men who dreamed dreams of how to make the earth a paradise. Their plan was to emigrate to America and form a Socialistic settlement there. The difficulty in the way of doing it was that they had no money. Also they would need wives, and only one, a Mr. Lovell, was married. But Mrs. Lovell had two sisters willing to marry, and so Coleridge, drawn to Bristol by his friendship with Southey, joined the circle, and married one of the sisters, while Southey married the other.

It was into this circle, already much broken up, and with its idea of emigration given up, that William and Dorothy Wordsworth came, when they left the Lake District for the West Country. Mr. Lovell had died; Southey had gone away to Portugal, where he was studying to get a firm foundation of knowledge about the Peninsula, which in later years would enable him to provide a home for the three sisters, the widow Lovell, Mrs. Coleridge and his own wife. Coleridge at this time, delighted with the early experiences of family life, was writing with joyful interest about his eldest child, Hartley.

From the summer of 1797 to the autumn of 1798 was undoubtedly the hap-

Often would the memory of his childhood come back to Wordsworth as he talked to the children he loved.

piest period in the life of poor Coleridge. For the first time he had the company of a woman with a poetical mind, Dorothy Wordsworth, who had come to live with her brother William at Alfoxden, near the Quantock Hills, in Somerset, three miles from Nether Stowey, where he was living. The three were constantly walking over to see each other—"three people, but only one soul," as Coleridge described their friendship.

JOTTINGS FROM THE JOURNAL OF DOROTHY WORDSWORTH

One only has to read Dorothy's journal, written at the time, to know whose were the sharp eyes that noted points for the two poets, who had now agreed to publish a volume together to illustrate Wordsworth's ideas of how poetry should be written in the simple language of the people. Here are some of her jottings:

Moss cups more proper than acorns for fairy goblets.

The (winter) ivy twisting round the oaks like bristled serpents.

The sound of the sea distinctly heard on the tops of the hills, which we could never hear in summer. We attribute this partly to the bareness of the trees, but chiefly to the absence of the singing of birds, the hum of insects, that noiseless noise which lives in the summer air.

The half-dead sound of the sheep-bell exquisitely soothing.

Full moon. She rose in uncommon majesty over the sea, slowly ascending through the clouds.

The sky spread over with one continuous cloud whitened by the light of the moon, which did not throw forth so strong a light as to chequer the earth with shadows. At once the clouds seemed to cleave asunder and left her in the centre of a black blue vault. She sailed along, followed by multitudes of stars, small, and bright, and sharp.

THE INFLUENCE OF DOROTHY IN HER BROTHER'S POETRY

When we read in Coleridge's Ancient Mariner, published in 1798 in that joint book of poetry, the most exquisite of all his stanzas and the prose accompaniment to it, can we doubt who it was who called his attention to the poetry of moonlight?

The moving Moon went up the sky
And nowhere did abide:
Softly she was going up,
And a star or two beside.

And then comes this gemlike prose comment: "In his loneliness and fixedness he yearneth towards the journeying Moon, and the stars that still sojourn, yet still move onward; and everywhere the blue sky belongs to them, and is their appointed rest, and their native country and their own natural home, which they enter unannounced, as lords that are certainly expected, and yet there is a silent joy at their arrival."

Who can doubt that William Wordsworth knew whom he was pleasing by using her observation when he wrote:

The Moon doth with delight
Look round her when the heavens are bare,
Waters on a starry night
Are beautiful and fair.

When we think of Wordsworth and Coleridge writing a simple book that marks a literary revolution we ought never to forget their companion Dorothy.

Wordsworth himself has told how when he, Dorothy and Coleridge were walking over the Quantock Hills to see Lynton and its Valley of Rocks, they agreed to unite in writing a volume of verse. In it Coleridge should deal with supernatural subjects taken from common life, while he told simple everyday stories.

THE FAMOUS BOOK THAT WAS GIVEN AWAY AS VALUELESS

The outcome was The Ancient Mariner, a poem which gives Coleridge a lasting place among poets who have done work that ranks as great through choiceness; and Tintern Abbey, the first poem by Wordsworth which announced to the world the message that was peculiarly his own.

The book, Lyrical Ballads, was published by Cottle, the Bristol bookseller who may be said to have patronized Coleridge and Southey, for he gave them prices for their early work which no one else would have given. When he sold all his copyrights to Longmans, Lyrical Ballads was rated as valueless and was given back to Wordsworth. But it is a book that stands as a landmark in literary history.

That is because it marked the final freedom of poetry from the rules that had been recognized in the eighteenth century. It claimed the right to regard any subject that aroused emotion as poetical, and to present it with simplicity, in language not formal or learned. But in reality Lyrical Ballads had small real value as literature, apart from The Rime of the Ancient Mariner, Tintern Abbey and one or two other poems. Its simplicity was overdone, and became in some places almost babyish. No poet has lent himself to the scoffer so freely as Wordsworth.

The reason was that he was totally devoid of humor. He could not see when his manufactured simplicity became unfortunately comical.

But while he was deliberately writing down to suit popular taste he had, from his West Country days, the power of plumbing the depths of thought in noble verse. The poem on Tintern Abbey tells how he revisited the place after five years and realized, under the spell of its beauty, how much the years had changed him. When he first came:

> The sounding cataract
> Haunted me like a passion: the tall rock,
> The mountain and the deep and gloomy wood.
> Their colours and their forms, were then to me
> An appetite; a feeling and a love
> That had no need of a remoter charm
> By thought supplied, nor any interest
> Unborrowed from the eye. That time is past.

Then he tells how his thought has been deepened by contact with mankind, and also by a sense of something sublime, if not divine, in nature.

> For I have learned
> To look on nature, not as in the hour
> Of thoughtless youth; but hearing oftentimes
> The still sad music of humanity,
> Not harsh nor grating, though of ample power
> To chasten and subdue And I have felt
> A presence that disturbs me with the joy
> Of elevated thought; a sense sublime
> Of something far more deeply interfused,
> Whose dwelling is the light of setting suns,
> And the round ocean and the living air,
> And the blue sky, and in the mind of man;
> A motion and a spirit that impels
> All thinking things, all objects of all thought,
> And rolls through all things.

One cannot imagine any eighteenth-century poet, even Cowper, writing in that strain of the Earth, not as a picture but as a living thing, speaking to the soul of man. That was the new tone which Wordsworth introduced into the great concert of English poetry.

Coleridge's Ancient Mariner was equally new and even more strange. It describes, in the simple, natural style of the old ballads, the fateful voyage of a ship, whose disasters were supposed to have come because of the shooting of an albatross, according to an ancient superstition of sailors. The spirit of loving-kindness, which is the moral of the poem, gives it a beauty beyond its literary form.

> He prayeth best who loveth best
> All things both great and small,
> For the dear Lord who loveth us
> He made and loveth all.

The poem, however, is the whole of Coleridge's poetry except some fine fragments. His life-work, but for The Ancient Mariner, is all fragmentary. Lacking in concentration and weakened by the use of opium, he drifted through life showing only how great he might have been, instead of being great.

THE DISTRIBUTOR OF STAMPS WHO WAS MAKING HIMSELF IMMORTAL

After the publication of Lyrical Ballads Coleridge and William and Dorothy Wordsworth visited Germany, but they did not bear very well the strain of travel together. So they left Coleridge behind and returned to England and settled in their native Lake District, where their circumstances became easier through the death of the Earl of Lonsdale and the payment of his debts by his successor. The amount received was $42,500. Wordsworth was also given annuities of $500 a year by each of two friends, and later held the office of distributor of stamps, with a salary of $2,000 and little work, so he was able to devote himself to his real life-work unhampered by poverty.

Coleridge, on returning from Germany, lived for a time in the Lake District, then went to London. He left his wife and family under the faithful care of Robert Southey, who now had settled in Keswick, and had so far renounced the wild opinions of his youthful days that he earned a substantial part of his living by writing for the Tory Quarterly Review.

ROBERT SOUTHEY, THE GOOD PROSE WRITER WHO MISSED HIS WAY

Southey never had any right to be classed as a Lake poet with Wordsworth or Coleridge, except the right of residence. Though some of his verses were in the simple ballad style favored by Wordsworth, and quite as good examples as Wordsworth's, his chief ideas of poetry were entirely and unfortunately his own. When he was quite a young man he had written on Joan of Arc, and the book, published by Cottle, had passed through five editions. This gave him a firm belief that he was a poet, first and foremost, and in that belief he set himself very difficult tasks in writing long poems which have long been forgotten.

Southey conceived the plan of writing a stately poem on each of the great religions. His Curse of Kehama represents Mohammedanism; his Thalaba represents the religions of the East, and Madoc was a study of the American Aztecs. Southey could write verse easily enough, too easily, but he missed his way in his choice of subjects. Now he is only remembered for his bright and clear prose in such works as his Life of Nelson and Life of Wesley. The real Southey is to be found, however, in his Letters.

THE THREE FRIENDS WHO PLANNED OUT MORE THAN THEY COULD PERFORM

As a man, Robert Southey was all that Samuel Taylor Coleridge was not. He was regular, self-controlled, dutiful, industrious and domestic, and he produced a great mass of workmanlike writing that would now be regarded as very respectable journalism. He died at Keswick, aged sixty-eight, a man of substance, though he had borne the burden of Coleridge's family as well as his own. Coleridge died at the age of sixty-one, in a London suburb, Highgate, where he had been long cared for by an amiable doctor, and had become a kind of national object of pride and pity.

Coleridge, Southey and Wordsworth all began with large views of what they could do. They planned more than they could perform. Coleridge thought he could outline a whole philosophy of life, but only talked fragments of it. Southey had great poetical schemes that failed to be poetical, and then wrote big prose histories which were not needed. And Wordsworth, too, had immense ideas of a great poem that would express the relations between man and nature, and man and his fellow-men. It was too vast ever to be possible, and it was never finished.

THE FRAGMENTS OF A POEM THAT WERE NEVER WELDED INTO ONE

His great poem was to be called The Recluse. What we now have of it is three fragments. One, called The Prelude, is extremely interesting from a personal point of view. It pictures the youth of the poet himself, and how he became mentally fitted by his experience, observation and thought to write this great poem. Then he wrote a part of the great poem itself, which he called The Excursion, and intended to fit into the whole. And he also wrote another fragment called The Recluse, with which he hoped, as it grew, to weld The Prelude and The Excursion. But this never happened, and the three large fragments remain three separate poems that were never made into one.

Very good reasons can now be seen, and at last were seen by Wordsworth, why his ambitious scheme could never be completed. Such a huge poem took many years to write, and to a large extent it contained the poet's opinions on all kinds of deep subjects. But as the years passed, his opinions changed, so that what he wrote when he was young must be contradicted to some extent by what he wrote in middle age, and be again changed by the doubts of old age, for Wordsworth lived to be eighty, and reluctantly gave up his desire to write. And so the plan of his life's work became partly wrecked. But the fragments of it contain much that is great and profound. The poet's finer thoughts are set in here and there like nuggets of gold.

THE GREAT POETRY THAT WORDSWORTH WROTE WHEN HE WAS YOUNG

Nearly all the poetry that places Wordsworth in the front rank of English poets, with only three or four other poets as his companions, was written before he was forty years old. It can be read in a good selection from the considerable mass of his writings. The extracts given from Tintern Abbey must suffice for quotation here, but in every collection from the poets can be found such exquisite poems as The Highland Reaper, Westminster Bridge, The Intimations of Immortality and She Was a Phantom of Delight—a poem to his wife. These and other poems are given in our own Book of Poetry.

At his best Wordsworth was one of the most melodious as well as thoughtful of poets, and his love of nature was, as he said, a passion. One of his earliest little poems tells the story of that love of nature in the simplest way.

My heart leaps up when I behold
A rainbow in the sky:
So was it when my life began;
So is it now I am a man;
So be it when I shall grow old,
Or let me die.
The Child is father of the Man;
And I could wish my days to be
Bound each to each by natural piety.

Wordsworth is the supreme poet of nature, and he is also throughout all his writing the poet of natural piety.

THE NEXT STORY OF LITERATURE IS ON PAGE 2489.

HOW CAN WE SEE WITH OUR EYES SHUT?

CONTINUED FROM 2252

EVERYONE knows that we frequently see bright colors, or "stars," when we shut our eyes. The nerves of sight always produce sight, whatever excites them. That is usually light, but it may be many other things. Pressure is one of them, and that is why we seem to see stars when we get a blow on the eye. When we shut our eyes tightly we cause some pressure on the eyeball, and so sensations of light are produced. Also, there are various things in the eye which are lit up by light, and reflect it for a short time even after the eye is shut, and the curtain at the back of the eye sees these things.

The retina has a way of seeing things more or less faintly after the eyes are shut, and these images are called after-images. Sometimes they are bright, as the thing itself was; sometimes they are seen as dark images corresponding to the bright thing we have been looking at.

We must remember, further, that the eyelids allow a certain amount of light to pass through them, so that we still see a little even when we close our eyes in the presence of light. In people who are not well the brain may give the sensation of light in closed eyes, apart from any light, and apart from after-images.

The spots that sometimes come before the eyes are of two distinct kinds. The one kind is permanent. The spots are always there, and always in the same place. They are due to something that should not be in the eye—most commonly a speck of the *cornea,* or the front part of the eye, which has been damaged in some way. Such opaque spots in the cornea throw shadows on the retina, and so are seen as spots before the eyes.

The other kind of spots is different. They are not permanent. They seem to be in different places at different times. Usually we do not notice them at all. They are the shadows thrown on the retina by white blood-cells moving through the fluids inside the eye, and so getting in the way of the light. As these cells move about, the shadows they throw are not seen always in the same place. White cells are usually traveling about in the eye, but usually we do not notice them.

When we have been awake all night, or have got tired from staying up too late and getting too excited, we get spots before our eyes, because our nerves have been made *too* sensitive, and so they notice the shadows of these cells, which a healthy eye does not notice. It is one of the most important facts about living matter, especially nerves, that when they are weak they get too sensitive or irritable.

IS A LEAF OF A PLANT WATERPROOF?

The answer is both yes and no, according to what we mean by waterproof. Usually the word means that a thing will not let water through it either way. That is true of waterproof clothes. But leaves and the skins of animals are waterproof only one way. The skin and the surface of a leaf will allow no water to enter them. In both cases the body of the living creature is so arranged that the surface—whether leaf or skin—shall be the outgoing, not the incoming, channel for water.

If water could enter, even after prolonged soaking, the whole arrangements for the circulation of water in the creature's body would be interfered with. When the surface of a leaf is carefully examined we find it has a sort of outer skin, not very different from ours. This is made of cells, the material of which has been changed for this purpose into something very much the same as cork, and which water cannot penetrate.

Rain is not at all bad for leaves, as it washes them and keeps them clean, thus keeping their surfaces clear for the purpose of breathing and for the use of the light that falls on them. But the plant no more drinks by its leaves than we do by the skin; it drinks entirely by its roots. Water is able to leave the leaf in the form of water-vapor at various points, but water cannot enter there.

Thus a leaf truly perspires, as our skins do, and for the same purpose; and in certain states of the air the water may become liquid, and lie in drops on the leaf. These drops look like dew, but are really like the drops on our skin when we have been running or taking violent exercise.

WHY DO SOME COLORS CHANGE IN ARTIFICIAL LIGHT?

The color of anything that gives no light itself, but shines by throwing back the light that falls on it, depends on much more than the thing itself. The thing itself can only reflect the light that falls upon it; it is creating nothing—only giving back to our eyes a part of what falls on it. Whether in artificial light or in daylight, the thing itself is the same, but its color may change if these two kinds of light are not the same.

Let us suppose a thing is able to reflect only a certain pure shade of blue, and that this blue is found equally in gaslight and in daylight. Then the color of the thing will be the same in both cases. But in many respects gaslight and daylight are different. Our eyes tell us at once that there is more yellow in gaslight than in daylight, but that is only one of many differences. The color of a thing may be a mixture, because it sends back to the eye two kinds of light together. Then, if one of these kinds of light does not go to make up part of gaslight, or is only very weak in gaslight, we shall see the thing entirely or mainly by the other of the two colors that went to make up its daylight color.

All this depends, of course, on the fact that daylight, gaslight, electric light, and, indeed, practically all the kinds of light we ever use to see by, are made up of a mixture of light of many colors; and the particular mixture varies in different cases. Even sunlight is by no means the same mixture of colors at all hours of the day.

WHY DOES NOT SEA WATER MAKE FISHES THIRSTY?

We might almost answer this question by another: How do we know that fishes are not thirsty? It is not at all easy to find out how much water fishes drink; but, like every living thing, they require water, and perhaps take a good deal.

We do not find that the muscles of a fish contain higher proportions of salts than the muscles of other animals; nor can we show any particular difference between the quantity of salts in the body of a fresh-water fish compared with the body of a salt-water fish. We know that many fishes travel from fresh to salt water, and from salt to fresh, but no one is yet in a position to tell exactly what such fish do in these cases. They certainly are able to adapt themselves to different kinds of water. This can only mean that the organs of the body which are concerned with keeping the composition of the blood right are able, when occasion requires, to filter an excess of salts out of it very quickly. The same is true of our own bodies, fortunately for us, as we often take food and drink containing an excess of various things which certainly must not stay long in the blood. On the other hand, we are not adapted to keep the composition of the blood right if we drink nothing but sea-water, as fishes can do without harm.

HAS AN ELEPHANT A BONE IN ITS TRUNK?

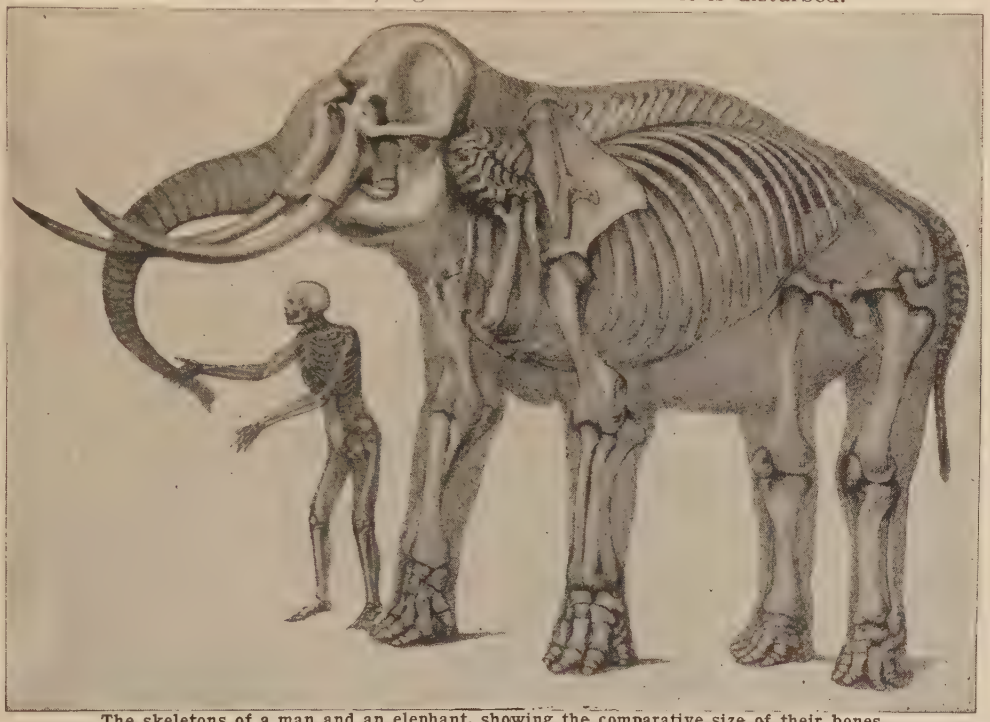
No, there are no bones at all in this strange organ that combines the purpose of the hand and the nose. The trunk is made up of a mass of muscles estimated to number about forty thousand.

Were it not for this organ the poor elephant would soon die, for he would be unable to feed or drink. His neck is short, due not to any shortage in the number of bones composing it but to the fact that the individual bones are themselves so short. This shortness, together with the projecting tusks which are only elongated teeth, prevent the animal from eating and drinking in the ordinary way. Without his trunk the elephant would starve; with it he is able to pull down branches of trees, to pick up grass and hay, and to take in water. In fact there is hardly anything the elephant cannot do with his trunk, from picking up a pin to hoisting his driver into the air. An Indian elephant which lost his trunk by accident was helpless, and had to be fed by hand for the rest of his days.

The skull of the elephant is a wonderful example of how Nature meets the special needs of her children. If the skull were like the skulls of most other animals, the head would be enormously heavy, too heavy for the creature to carry comfortably, and the long trunk could not be attached securely to the skull. The bone of the elephant's skull, however, is amazingly light, and this is due to the fact that it is full of air chambers.

WHAT DO WE MEAN BY STABLE EQUILIBRIUM?

Equilibrium is balance, and by stable equilibrium we mean balance which is not easily disturbed and which tends to recover itself if it is disturbed.



The skeletons of a man and an elephant, showing the comparative size of their bones.

A book lying on its side is in a state of stable equilibrium; we may lift each corner high, yet it returns to its former steady position. A tight-rope dancer carrying across his body a long pole equally weighted at each end can produce in himself a state of stable equilibrium, so that, though he may sway from side to side, he always returns to a balanced position.

On the other hand, a book set up on end is in unstable equilibrium for it is easily upset, and is made to change from the perpendicular to the horizontal position. A tight-rope walker without a weighted pole is also in unstable equilibrium, for his balance may be upset.

IF A FEATHER IS LIGHTER THAN AIR WHY DOES IT EVER SETTLE?

Nothing is more certain than that if a feather were really lighter than air, it never would settle. If a feather in time *does* fall to the ground, it must be heavier than air, whatever we may think at first. If we were to take all the matter composing a feather and put it together again in a different form, it would drop at once. The business of the feather is to serve the life of a creature that flies, and therefore Nature has made it as light as possible. It is made so that it will itself hold air, and is spread out in such a way as to take the utmost possible advantage of the supporting power of the air. Yet, like many other things which the air will support for a time, the feather is heavier than air, and therefore if the air is still, the feather must fall. It falls under the force of gravitation. If the air, however, is thrown into motion by the wind, the motion endows it with a force which may be greater than that of gravitation, and so the feather may be lifted from the ground into the air. It is all a question of the balance between one force and another.

WHY DOES EVERYONE GROW OLD?

This is a most difficult question, which some of the wisest men alive are trying to answer. The chief reason seems to be that gradually there is heaped up in our bodies a certain amount of the waste products of our lives. We get rid of most of these quite easily, especially the gaseous ones, like carbon dioxid. But there are others which we do not completely get rid of, and at last they poison us, make our limbs and joints stiff, our hair fall out or turn gray, our skin shrivel, and so on.

This process takes longer in some people than in others. It is strictly true to say that some people are older at forty than others are at seventy. It is not the mere passage of time that makes us old, but what is happening during that time in our bodies. People who lead wise lives, especially people who do not eat too much or drink too much, and who get enough sleep, during which the body gets rid of and destroys many of the poisons it produces in the daytime, do not grow old so quickly as other people. Also this is true of people who have quiet minds. Great worry or sorrow ages people; it interferes with the power of the body to recover from exertion and to get rid of its poisons, and so unhappy or fretful people get old more quickly than those who lead calm and happy lives. The people who take longest to get old are those who act on two good proverbs: "The best doctors are Dr. Quiet, Dr. Diet and Dr. Merryman"; and

> Joy and Temperance and Repose
> Slam the door on the doctor's nose.

WHY IS THERE A STONE INSIDE A CHERRY?

Or, let us say, Why has a stone a cherry? These things are beautifully made for a great purpose, which is to reproduce the race of plants to which they belong. The all-important part of the cherry is not the part we eat, but the kernel inside the stone. It is this that will grow into a new plant if it gets a fair chance; and the rest of the fruit exists in order to give the kernel, or seed, a fair chance.

First there is the hard part of the stone, which protects the living seed inside it from any injury, but which is so made that it can quite easily be split open when the kernel inside it starts growing. Then there is the juicy part, for the sake of which we prize the cherry. Now, birds prize this just as much as we do, and that is why it exists. The bird takes the cherry for the sake of the juicy part, and carries it away, dropping the stone in some place where it may be possible for the seed to grow. Lastly, the skin of the cherry helps in protecting the fruit from insects. So now we begin to see that there is a very good reason indeed why plums and cherries should have stones.

WHY DO WE FIND ICE SLIPPERY?

We slip and slide and skate easily on ice, not only because ice is smooth, and so offers little resistance or friction, but also because ice melts under the pressure of our weight, and thus becomes wet. We could make surfaces smoother than the surface of ice, but we should not find them so suitable for skating just for this reason—that, unlike ice, they would not melt under pressure. In very intense frost the ice may become so cold that it will not melt under ordinary pressures, and in that case the ice is found to be not more slippery than a smooth pavement.

THE NEXT WONDER QUESTIONS ARE ON PAGE 2483.

AN AMERICAN GIRL'S FAMOUS POEM

EVERY boy and girl is familiar with some lines of this poem. It describes, with great dramatic effect, how a young Englishwoman sought to save her sweetheart by preventing the curfew bell from tolling, that being the signal for his death. The curfew, or evening bell, originated after the Norman Conquest, and was first intended as a warning to the Saxon peasantry to put lights out in their houses. "Curfew" comes from two French words, "couvre feu," meaning "cover the fire." The author of the poem is Rose Hartwick Thorpe, and she was born in Indiana, July 18, 1850. She wrote the poem when little more than a schoolgirl.

THE CURFEW BELL

CONTINUED FROM 2248

ENGLAND'S sun was slowly setting
o'er the hill-tops far away,
Filling all the land with beauty at the close of one sad day,
And its last rays kissed the forehead of a man and maiden fair,
He with steps so slow and weary, she with sunny floating hair;
He with bowed head, sad and thoughtful; she with lips all cold and white,
Struggling to keep back the murmur:
"Curfew must not ring to-night!"

"Sexton," Bessie's white lips faltered, pointing to the prison old,
With its walls so tall and gloomy, moss-grown walls, dark, damp, and cold,
"I've a lover in that prison, doomed this very night to die
At the ringing of the Curfew, and no earthly help is nigh;
Cromwell will not come till sunset." And her lips grew strangely white
As she spoke in husky whispers:
"Curfew must not ring to-night!"

"Bessie," calmly spoke the sexton (every word pierced her young heart
Like a gleaming death-winged arrow, like a deadly poisoned dart),
"Long, long years I've rung the Curfew from that gloomy shadowed tower;
Every evening, just at sunset, it has tolled the twilight hour.
I have done my duty ever, tried to do it just and right;
Now I'm old, I will not falter,
Curfew bell must ring to-night!"

Wild her eyes and pale her features, stern and white her thoughtful brow;
And within her heart's deep centre Bessie made a solemn vow.
She had listened while the judges read, without a tear or sigh:
"At the ringing of the Curfew Basil Underwood must die."
And her breath came fast and faster, and her eyes grew large and bright:
One low murmur, faintly spoken:
"Curfew must not ring to-night!"

She with quick step bounded forward, sprang within the old church door;
Left the old man threading slowly paths he'd trod so oft before.
Not one moment paused the maiden, but, with cheeks and brow aglow,
Staggered up the gloomy tower, where the bell swung to and fro;
As she climbed the dusty ladder, on which fell no ray of light,
Up and up her pale lips saying:
"Curfew shall not ring to-night!"

She has reached the topmost ladder; o'er her hangs the great, dark bell;
Awful is the gloom beneath her, like the pathway down to hell.
See! the ponderous tongue is swinging; 'tis the hour of curfew now,
And the sight has chilled her bosom, stopped her breath, and paled her brow.
Shall she let it ring? No, never! flash her eyes with sudden light,
As she springs, and grasps it firmly:
"Curfew shall not ring to-night!"

Out she swung—far out. The city seemed a speck of light below,
There 'twixt heaven and earth suspended as the bell swung to and fro,
And the sexton at the bell-rope, old and deaf, heard not the bell,
Sadly thought that twilight curfew rang young Basil's funeral knell.
Still the maiden, clinging firmly, quivering lip and fair face white,
Stilled her frightened heart's wild beating:
"Curfew shall not ring to-night!"

It was o'er; the bell ceased swaying; and the maiden stepped once more
Firmly on the dark old ladder, where, for hundred years before,
Human foot had not been planted. But the brave deed she had done
Should be told long ages after: as the rays of setting sun
Light the sky with golden beauty, aged sires, with heads of white,
Tell the eager, listening children,
"Curfew did not ring that night."

O'er the distant hills came Cromwell. Bessie
sees him; and her brow
Lately white with fear and anguish, has no
anxious traces now.
At his feet she tells her story, shows her
hands all bruised and torn;
And her face so sweet and pleading, yet with
sorrow pale and worn,
Touched his heart with sudden pity, lit his
eyes with misty light.
"Go! Your lover lives!" cried Cromwell.
"Curfew shall not ring to-night!"
Wide they flung the massive portal, led the
prisoner forth to die,
All his bright young life before him. 'Neath
the darkening English sky
Bessie came, with flying footsteps, eyes aglow
with love-light sweet;
Kneeling on the turf beside him, laid his par-
don at his feet.
In his brave, strong arms he clasped her,
kissed the face upturned and white,
Whispered: "Darling, you have saved me;
Curfew will not ring to-night!"

OH, LOOK AT THE MOON!

These simple childlike verses were written by an American lady named Eliza Lee Follen about seventy years ago. Mrs. Follen was born in 1787 and died in 1860; she wrote many similar old-fashioned pieces, chiefly for young people.

OH, look at the moon!
She is shining up there;
Oh, mother, she looks
Like a lamp in the air.

Last week she was smaller,
And shaped like a bow;
But now she's grown bigger,
And round as an O.

Pretty moon, pretty moon,
How you shine on the door,
And make it all bright
On my nursery floor!

You shine on my playthings,
And show me their place,
And I love to look up
At your pretty bright face.

And there is a star
Close by you, and may be
That small, twinkling star
Is your little baby.

MINE HOST OF THE "GOLDEN APPLE"

It is a very old custom for inns and public-houses to adopt some sign to distinguish them. The "Red Lion," the "Green Man," the "Bunch of Grapes," and such like are familiar. The "Golden Apple" has also been so used, but here a poet reminds us that the place where nature's apples grow is better than that with the painted sign of the "Golden Apple." The verses are by Thomas Westwood.

A GOODLY host one day was mine,
A Golden Apple his only sign,
That hung from a long branch, ripe and fine.

My host was the beautiful apple-tree;
He gave me shelter and nourished me
With the best of fare, all fresh and free.

And light-winged guests came not a few,
To his leafy inn, and sipped the dew,
And sang their best songs ere they flew.

I slept at night on a downy bed
Of moss, and my host benignly spread
His own cool shadow over my head.

When I asked what reckoning there might
be,
He shook his broad boughs cheerily:
A blessing be thine, green apple-tree!

ROCK OF AGES

This beautiful hymn was written by Augustus Montague Toplady. It is found in many church hymnals, and has become familiar and dear to the hearts of many of us.

ROCK of Ages, cleft for me,
Let me hide myself in Thee.
Let the water and the blood,
From Thy riven side which flowed,
Be of sin the double cure—
Cleanse me from its guilt and power.

Nothing in my hand I bring—
Simply to Thy cross I cling;
Naked come to Thee for dress—
Helpless look to Thee for grace;
Foul, I to the Fountain fly—
Wash me, Saviour, or I die.

While I draw this fleeting breath,
When my eye-lids close in death,
When I soar to worlds unknown,
See Thee on Thy judgment-throne,
Rock of Ages, cleft for me,
Let me hide myself in Thee.

A PRAYER

LORD, who art merciful as well as just,
Incline thine ear to me, a child to dust.
Not what I would, O Lord, I offer Thee,
Alas! but what I can.
Father Almighty, who has made me man,
And bade me look to heaven, for Thou there,
Accept my sacrifice and humble prayer.
Four things which are not in Thy treasury
I lay before Thee, Lord, with this petition:
My nothingness, my wants,
My sins, and my contrition.

—ROBERT SOUTHEY.

WELCOME TO SPRING

This beautiful poem, which breathes the very spirit of spring, was written by Pierre de Ronsard, one of the great French poets of the sixteenth century. He was intended for the diplomatic service of his country, and was sent on more than one mission, but his career in this direction was cut short in early life by deafness. Far from being discouraged, however, he set himself to study and write. In spite of constant ill-health, he became the head of a group of poets called the Pleiades, who did much to give French literature the standard it has since upheld.

GOD shield ye, heralds of the spring,
Ye faithful swallows fleet of wing,
Hoops, cuckoos, nightingales,
Turtles and every wilder bird,
That make your hundred chirpings heard
Through the green woods and dales.

God shield ye, bright embroidered train
Of butterflies, that, on the plain,
Of each sweet herblet sip;
And ye new swarm of bees that go
Where the pink flowers and yellow grow
To kiss them with your lip.

A hundred thousand times I call—
A hearty welcome on ye all:
This season how I love!
This merry din on every shore,
For wind and storms, whose sullen roar
Forbade my steps to rove.

SHAKESPEARE

Matthew Arnold, in this fine sonnet, conveys a splendid sense of Shakespeare's eminence over all the master-minds that have written in the English language. "Others abide our question" means that while other great poets or thinkers may be open to criticism or to question, Shakespeare speaks through his immortal verse with the very voice of truth itself and cannot be "questioned."

OTHERS abide our question. Thou art free.
We ask and ask—Thou smilest and art still,
Out-topping knowledge. For the loftiest hill,
Who to the stars uncrowns his majesty,
Planting his steadfast footsteps in the sea,
Making the heaven of heavens his dwelling-place,
Spares but the cloudy border of his base
To the foiled searching of mortality;

And thou, who didst the stars and sunbeams know,
Self-schooled, self-scanned, self-honoured, self-secure,
Didst tread on earth unguessed at—Better so!

All pains the immortal spirits must endure,
All weakness which impairs, all griefs which bow,
Find their sole speech in that victorious brow.

ENGLAND, MY ENGLAND

This rapturous song to England, by William Ernest Henley, has been like the bugle call it commemorates. Its echoes have sounded in the poetry of Rudyard Kipling, Henley's successor as a patriot poet; and in its spirit millions of men offered their lives for their country in the World War.

WHAT have I done for you,
England, my England?
What is there I would not do,
England, my own?
With your glorious eyes austere,
As the Lord were walking near,
Whispering terrible things and dear
As the Song on your bugles blown,
England—
Round the world on your bugles blown!

Where shall the watchful Sun,
England, my England,
Match the master-work you've done,
England, my own?
When shall he rejoice agen
Such a breed of mighty men
As come forward, one to ten,
To the Song on your bugles blown,
England—
Down the years on your bugles blown?

Ever the faith endures,
England, my England:—
"Take and break us: we are yours,
England, my own!
Life is good, and joy runs high
Between English earth and sky:
Death is death; but we shall die
To the Song on your bugles blown,
England—
To the stars on your bugles blown!"

They call you proud and hard,
England, my England:
You with worlds to watch and ward,
England, my own!
You whose mailed hand keeps the keys
Of such teeming destinies,
You could know nor dread nor ease
Were the Song on your bugles blown,
England,
Round the Pit on your bugles blown!

Mother of Ships whose might,
England, my England,
Is the fierce old Sea's delight,
England, my own,
Chosen daughter of the Lord,
Spouse-in-Chief of the ancient Sword,
There's the menace of the Word
In the Song on your bugles blown,
England—
Out of heaven on your bugles blown!

IN AFTER DAYS

Austin Dobson, the graceful writer of these tender verses, is no longer living and the testimony he asks for can be paid to his memory without reserve. His modest claim will be more than granted in after days. Many a reader will delight in his verses, bright with delicate humor and always pure and fine in sentiment.

IN after days, when grasses high
O'er-top the stone where I shall lie,
Though ill or well the world adjust
My slender claim to honoured dust,
I shall not question or reply.
I shall not see the morning sky;
I shall not hear the night-wind sigh;
I shall be mute, as all men must
In after days!
But yet, now living, fain would I
That some one then should testify,
Saying, "He held his pen in trust
To Art, not serving shame or lust."
Will none?—Then let my memory die
In after days!

THE BUCKLE

A pretty example of the dainty muse of Walter de la Mare as it finds expression in his delightful Songs of Childhood.

I HAD a silver buckle,
I sewed it on my shoe,
And 'neath a sprig of mistletoe
I danced the evening through!

I had a bunch of cowslips,
I hid them in a grot
In case the elves should come by night
And me remember not.

I had a yellow riband,
I tied it in my hair
That, walking in the garden,
The birds might see it there.

I had a secret laughter,
I laughed it near the wall;
Only the ivy and the wind
May tell of it at all.

GERMAN FOLK-SONGS IN ENGLISH VERSE

Folk-songs are simple songs made by the folk, or people, for the most part, long ago. Compared with the music of to-day, folk-songs are like wild flowers beside garden flowers. Every nation has its folk-songs; on this page and the next appears a selection from the German, translated into English by Alfred Percival Graves, M.A., an English school-inspector, also famous as an author and song-writer, his merry Irish song about Father O'Flynn being popular all the world over. The words of these German folk-songs are simple and clear, and the tunes are easy to remember, with a good lilt about them. They are taught to German children at school, and the children grow so fond of them that they remember them all through their lives, singing them in their homes in the evenings, or in the open air when holidaying, or even when on long walking trips. We used to sing such songs in this country long ago and are beginning to sing them again at our schools and concerts.

WERE I A BIRDIE TOO

WERE I a birdie too, I'd fly away with you
Far o'er the foam;
But since that cannot be, but since that cannot be,
I'll stay at home.
Still in the autumn light, valley and wood and height
Joyfully glow;
Free o'er the mountain-side still I can wander wide,
While the winds blow.
Then you, dear birdie, fly far, far across the sky;
I must bide here.
But with the spring, come back, but with the spring, come back,
Do, birdie, dear!

THE SONG OF THE TWO HARES

'TWIXT a hill and hollow, hollow pass,
Two young hares were lying;
Nibbling at the juicy, juicy grass,
Nibbling at the juicy, juicy grass,
How the blades went flying!
When they'd both their little paunches filled,
Down they did squat them;
Then, as in sleep they both were stilled,
Then, as in sleep they both were stilled,
Came a churl and shot them!
When they both had pulled themselves together
And at last concluded
That they still were sitting on the heather,
That they still were sitting on the heather,
Down the hill they scooted!

THE DANCE OF THE FLOWERS

THE lilies of the valley chime
Their joy-bells sweet and low.
Now, wild flowers, 'tis your dancing time!
What makes you dally so?
Blue, yellow, white, they hurry up,
They're flocking faster still!
The daisy and the buttercup,
Wood-violet, daffodil.
Then O, while out of heaven the moon
Looks down with joyful glance,
The lilies ring and ring the tune,
The blossoms dance and dance.
Jack Frost he stamps his iron foot;
"How dare you dance and play?"
The lily-bells, alas! are mute,
The blossoms hide away.
But hardly has that churl of churls
Forsook their favourite glen,
When hark! the lilies' peal of pearls
Is awakening once again.
I hear myself its silver hum;
At home how can I stay?
O flowers, 'tis calling me to come
And dance with you away!

SON OF MY HEART

SLEEP, sonny darling, your mother's delight!
Close your blue eyes up, there, close them up quite!
Everything's quiet all over the house—
Nothing is stirring but one nibbling mouse.
Angels as lovely, my laddie, as you,
Nodding and smiling, are watching us, too;
When you are older, perhaps they will fly
And wipe the big tear-drop from out of your eye.
Gilded by sunbeams now all your days go;
Later, ah, later it will not be so!
Then, without number, Care's shadowy hand
Will keep away slumber as by you they stand.
Sleep, my heart's darling, the dark night is nigh,
Sleep on in safety, for mother is by.
Nay, never fear you, my own curly-pate,
Mother is near you, both early and late.

GOD ONLY KNOWS

COULD you count the bright stars peeping
Through the sky so soft and blue,
Or the cloudlets gently creeping,
Tell me, could you count them too?
Only God, who never slumbers,
In His head could hold their numbers,
For He made them every one.
Could you count the midges dancing
On the golden summer beam,
Or the little fishes glancing
Up and down the crystal stream?
God has called them into being,
All their happy hours foreseeing—
That is why they frolic so!
Children, could you count the number
Of the little curly heads,
Starting out of rosy slumber
From their happy little beds?
God the Father sees and knows them,
All his loving kindness shows them—
Knows and loves you every one!

THE HOBBY-HORSE

HOP, hop, hop!
Without stay or stop;
Over walls and fences flying,
Never jibbing, never shying.
Without stay or stop,
See my pony hop.

Tip, tip, toff!
Don't you shake me off!
Just you stop that mad curvetting,
Or the whip you'll soon be getting!
Do not shake me off!
Tipty, tipty, toff!

Ho, there, ho!
Woa, my pony, woa!
Ostler, ostler, Jinny, Joany,
Fetch the fodder for my pony!
Woa, my pony, woa!
Ho there, ho there, ho!

Whack, whack, whack!
How my whip I crack!
Wish that they would listen to me—
Yes, I think that that will do me.
How my whip I crack!
Whack, and whack, and whack!

Stay, now stay!
Don't you run away!
For the journey still before you,
Hay and oats will quite restore you.
Don't you run away!
Stay, my pony, stay!

THE FIR-TREE

O FIR-TREE fine, O fir-tree fine,
How faithfully you flourish!
Not only in the summer's glow,
But through the winter's scourging snow,
O fir-tree fine, O fir-tree fine,
How faithfully you flourish!

O fir-tree fine, O fir-tree fine,
What joy, what joy you've brought me!
When year by year your branches green,
My childhood's Christmas-trees have been,
O fir-tree fine, O fir-tree fine,
What joy, what joy you've brought me!

O fir-tree fine, O fir-tree fine,
From you I've learned the lesson:
That hope and trust through trial keen,
Still keep our courage ever green.
O fir-tree fine, O fir-tree fine,
From you I've learned that lesson!

LADYBIRD, FLY

Words by Alfred P. Graves

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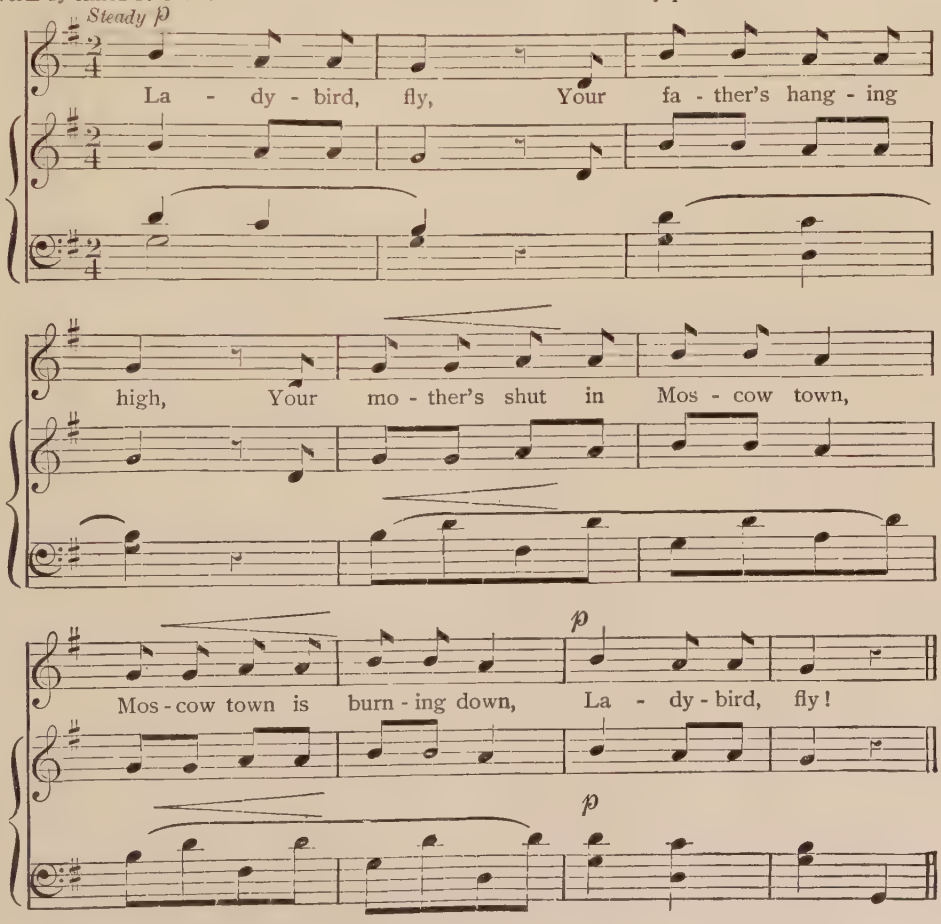


LITTLE VERSES FOR VERY LITTLE PEOPLE

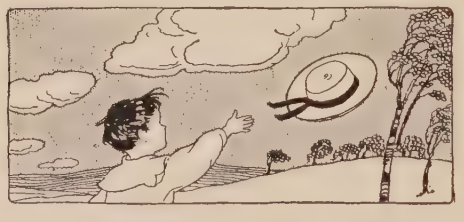
IN marble walls as white as milk,
Lined with a skin as soft as silk,
Within a fountain crystal clear,
A golden apple doth appear.
No doors there are to this strong-hold,
Yet things break in and steal the gold.

LONG legs, crooked thighs,
Little head, and no eyes.

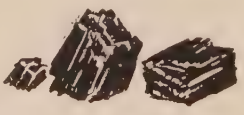
FLOUR of England, fruit of Spain,
Met together in a shower of rain,
Put in a bag tied round with a string,
If you'll tell me this riddle, I'll give you a ring.

I HAVE a little sister, they call her Peep, Peep;
She wades the waters deep, deep, deep;
She climbs the mountains high, high, high;
Poor little creature she has but one eye.

ARTHUR O'BOWER had broken his band,
He comes roaring up the land—
The King of Scots, with all his power,
Cannot turn Arthur of the Bower!

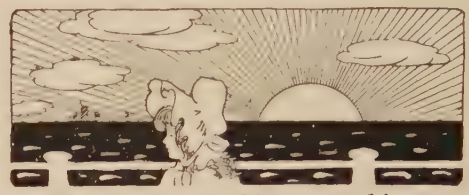


BLACK we are, but much admired;
Men seek for us till they are tired.
We tire the horses, but comfort man;
Tell me this riddle if you can.



AS I was going o'er Westminster Bridge,
I met with a Westminster scholar;
He pulled off his cap, *an' drew* off his glove,
And wished me a very good-morrow.
What is his name?

HICK-A-MORE, Hack-a-more,
On the king's kitchen door;
All the king's horses,
And all the king's men,
Couldn't drive Hick-a-more, Hack-a-more,
Off the king's kitchen door!



THERE was a king met a king
In a narrow lane;
Says this king to that king:
"Where have you been?"
"Oh, I've been a-hunting
With my dog and my doe."
"Pray lend him to me,
That I may do so."
"There's the dog, *take* the dog."
"What's the dog's name?"
"I've told you already"
"Pray tell me again."

AS I went through a garden gap,
Who should I meet but Dick Redcap!
A stick in his hand, a stone in his throat,
If you'll tell me this riddle, I'll give you a groat.

OLD Mother Twitchett had but one eye,
And a long tail which she let fly;
And every time she went over a gap,
She left a bit of her tail in a trap.

THIRTY white horses upon a red hill,
Now they tramp, now they champ, now they stand still.

AS soft as silk, as white as milk,
As bitter as gall, a thick wall,
And a green coat covers me all.

Space—From the beautiful painting by Chintreuil.

NATURE ARTISTS OF FRANCE

CONTINUED FROM 2240

THE story of French art has always had vivid and changing qualities. Each period is like a chapter containing a separate story of its own that could be read with interest apart from the rest of the volume to which it belongs. The longest chapter is the Century of Louis XIV, telling the tale of the growing-up of French art and how it suffered from the leading-strings of the king and his ministers, how it grew yearly more depressed.

In the next movement comes a sudden burst of song as Watteau and his friends go dancing and walking gallantly through the pages. Then follows David, with his lofty Greek ideals —the classic movement. As that fades there appears the brilliant generation of the romanticists. And after that chapter, what next? A green field and the glorious out-of-doors.

Up to this time all pictures had been painted in studios, and landscapes had been adapted to the needs of a composition. An artist who had really "sat at the feet of Nature" was unknown in France. Delacroix, the leader of the romanticists, after having seen the work of the English painters, had tried to get freshness into his landscapes, but the fields and skies had always been of far less importance than the figures for which they formed a background. He nevertheless prepared the way for men who would see a landscape as a whole. It was the influence of the English artists, Constable and Bonington, and the study of Dutch painters like Ruisdael and Hobbema that first set French artists at work out of doors.

They were for a time shy and uncomfortable in the presence of the grandeur and complexity of nature. They were, at first, as awkward as we might be if, having made up a kind of face to draw on cards and in albums, we were set before a model and told to draw that. The round, breathing face is so different from the easily drawn profile which we have done "out of our heads."

And what is one face in a studio compared with natural forms at home in the open—when light comes from every quarter instead of most conveniently through one window; when the push of the earth through space changes that light every minute without our knowing it; when each object in the landscape receives and reflects light, as well as casts a shadow? The early nature artists of France came face to face with the most difficult of problems, and soon were to learn the truth of a famous artist's saying, that light is the principal person in the picture.

In the meantime they set themselves the copyist's task. They took up their easels and transferred themselves from Paris to Barbizon in the forest of Fontainebleau, and there they tried to paint what they saw. The men of the old school cried out on them as traitors. These had inherited the tradition rooted in France by lovers of Poussin and Claude Lorrain—those seventeenth-century French artists whose lives were spent in Italy—that a landscape, to be noble, must be Italian. The men at Barbizon went sturdily on, nevertheless, painting rocks and trees and pools, and once more a new art arose in France.

THE MARVELOUS DETAIL THAT ROUSSEAU PUT INTO HIS PICTURES

The most faithful and painstaking of the Fontainebleau school was Théodore Rousseau, who lived from 1812 to 1867. He painted many kinds of nature subjects, but strove most of all to make worthy pictures of the forest oaks. His great difficulty was that he was continually seeing too much, and was burned up by a zeal to put it all down—every twig, every leaf. If we look at almost any of his paintings, we shall have some idea of the astounding patience and industry of this man who truly painted the portraits of the ancient Fontainebleau trees. Next to the fine collection of his works in the Louvre comes that in the Metropolitan Museum of Art in New York.

Diaz and Dupré also were leaders of this new school, but they were not absorbed by the same passion for precise detail; their art was not so much that of the copyist. Diaz (Narcisse Diaz de la Peña) was a dreamer, and sometimes did not see the wood at all for a veil which by his mystic imagination was spun across the glades. The brilliant sunshine of summer and the rich coloring of autumn are reflected in his canvases, which are to be seen in the Louvre and in many other collections in Europe and America.

THE PAINTERS OF THE OUT-OF-DOORS WHO CLEARED THE PATH FOR OTHERS

Jules Dupré was different from both Rousseau and Diaz. He had neither the photographic eye of the one nor the vision of the other, but he was born with an instinct to know what should be left out in making a picture. He composed scenes of the forest and the countryside, building up masses of greenery and concentrating the light. To use the slang of artists, he "cooked" his pictures a little; transformed them in the studio till they were that magnificent thing Dupré thought a landscape ought to be. This exaggerated grandeur is well shown in Low Tide, and The Great Oak, in the Louvre.

Before they had done any great part of their work, these early painters of the Fontainebleau school had won their way, held their own against the adverse opinions of older artists, and opened up the path for the better work which was to follow. Daubigny and Chintreuil, a little younger, then had their turn, painting not so much the forests as open fields almost smelling of blossom and dew. To these men the earth was very much in subjection to the sky; light and tranquillity drift through their pictures like a slow tide. The Banks of the Oise, and Spring, in the Louvre, are excellent specimens of Daubigny's work, and Space, in the Louvre, of Chintreuil's.

Some gifted animal-painters, too, were busy about this time, such as Troyon, Charles Jacques, Rosa Bonheur and Brascassat. Troyon stands out as a greater master than the rest. Two of his best pictures are Oxen Going Out to Plow—a fine study of the patient beasts against the early morning sunlight—and Feeding Poultry, both in the Louvre.

THE MILESTONES BY WHICH WE TRACE THE PROGRESS OF FRENCH ART

One of the greatest landscape-painters of Europe was working at the same time. This was the genial, kindly Jean Baptiste Camille Corot, who lived from 1796 to 1875. His is one of the high names in French art. Looking backward, we can trace the course of the country's progress by the milestones of names like Corot, Chardin, Watteau, Poussin, Fouquet: each very different from the others, all breathing genius—artists not only of France but of the world.

Corot was a school in himself. His personality was so strong that although he passed through many phases, beginning with the tight, severe line of classicism and ending in a vibrating looseness of line, his work could never be confused with any other man's. If we look at his landscapes we see at once how distinct they are from those of the Barbizon painters of his day. He painted a tree, a field, not as we should see them, but with an added and mysterious touch—the poetry of shape and light.

Corot was always making these little miracles. He gives to trees and skies something that recalls in us the feelings that we have in the presence of great music's mystery, or the throb of lofty verse—something that is more than melody and more than words. We seem to be taken to another world, and find that all the time it is our own, but that we are seeing it with the eyes of the soul.

This mysterious power of giving a spiritual beauty to earthly things was Corot's peculiar genius. In the course of his long life he painted many kinds of subjects, went more than once to Italy and worked there, made portrait-studies, and beautiful pictures of towns, like The Belfry at Douai, in the Louvre, and La Route, in a private collection.

The play of atmosphere on solid shapes, trees piled up against the sunset or scattered to let the morning mists creep through, made the love of Corot's life. He was a little impatient of broad sunlight, which, in return for its gifts of warmth and splendor, takes away the tender mysteries of the dawn and early hours of the day. Morning after morning he would get up and go out to work at the hour when farm laborers rise, so that when the first gleam of the dayspring stole across the fields he was ready to catch the secret of its color. He stayed until the powdery blue shadows under trees and hedgerows were driven away by the clear light; then went home again. Evening would see him waiting for the other magic hour of the day, when the sun has set and the after-light clings lovingly to the face of pasture and stream. Thus did he fill his soul with visions of nature. You may read his own account of his feelings in a letter to Dupré on page 6034.

Nature wears a garment of special loveliness to salute the coming and going of night, but only artists and dreamers like Corot and Wordsworth catch more than a glimpse of it; in the early morning most of us are hugging our pillows and at dusk we hasten to turn on the light. And in the meantime this silent and spiritual pageant is passing by.

Burning Weeds, by Millet.

Corot's pictures have found their way into collections, public and private, all over the world. The Rouen Museum treasures, among other pictures, The Ponds of Ville d'Avray; and in the Louvre are The Dance of the Nymphs, Paysage, Souvenir of Italy, The Arras Road, Landscape at Morning, Le Pont de Nantes, and many others. In America, the Metropolitan Museum in New York, the Corcoran Gallery in Washington, the Art Institute of Chicago, and the Walters Gallery in Baltimore, besides various private collections, possess notable examples of Corot's painting.

This kindly, humble and modest artist, who was always ready to praise other men's work, has become the friend of beauty-lovers all over the world. Corot is thought of as the sweet lyric poet of the Barbizon group; Dupré as the dramatic poet; and Rousseau as the epic poet. Corot himself said: "Rousseau is an eagle. As for me, I am only a lark, putting forth some little songs in my gray clouds."

Another man, younger than Corot, painting on the plain beyond the Fontainebleau Forest, was, like him, dwelling very close to nature and avoiding artificial things. This was Jean François Millet (1814–75). These two artists are linked in their generation, and yet their working standpoints are very different. Corot often put small figures into his landscapes —a shepherd with a pipe, an unobtrusive wayfarer, staff in hand, or a group of dancing nymphs; but they are not essential to the scene. Like Watteau's ladies and gentlemen, they are a little remote. Millet, on the other hand, saw earth and

sky as ground and background for his figures, and if he paints landscape alone, one feels that there are people that belong in it but for the moment have walked away.

Millet is famous as one of the greatest painters the world has known of men and women whose lives are closely bound with the soil and succession of the seasons: humble people, peasant workers. But powerful though the figures in his pictures may be, they are not so much individual persons as an idea of what the persons represent. It is here that Millet is more closely in touch with Corot than with any other of his generation. Corot's pictures are, so to speak, painted by means of the eye of the soul, Millet's by the eye of the mind.

THE FEELINGS THAT HAVE INSPIRED THE GREAT ARTISTS

Artists, we know, paint for many reasons. Some, like Titian and Giorgione, paint because color fills them with a riot of happiness, and they care little what they paint if only they can go on expressing the joy and the loveliness they see. Some, like Rembrandt and Velasquez and Van Dyck, paint because they have the secret of the human heart and must set it down in the characters of the human face. Some, like David and Poussin, paint because they are as much historians and archæologists as artists, absorbed in the grandeur of the ancient world and the beauty once revealed by Greece. Millet painted because his brush was the best pen he could find, and with it he has told for all time the stories that filled his mind—stories of sons of the soil: plowmen, laborers, shepherds.

THE LOWLY PEOPLE TO BE FOUND ON THE CANVASES OF MILLET

These are not painted in an Arcadian fashion. Millet did not draw his shepherds and plowmen from the point of view of the townsman or the courtier, who might think how simple and how lovely it would be to dwell on nature's bosom, watch the sheep, bask in the sun, play a pipe and sing a song. He painted men and women of dull thought and slow speech and much endurance, whose hands are horny and badly cracked in winter, whose lives are hard and for whom food is scanty.

The country people in Millet's pictures have become curiously like the fields they labor in. They walk heavily, seem weighted to the earth, and find it difficult, by reason of much service, to stand upright. They are the peasantry of Christendom—a class of people who, thanks to education, must soon belong to the past.

Millet did not draw his men and women direct from models. They were faithful impressions of his own thought and memory. He went about in the fields a great deal watching people at work, and so caught the gestures natural to them. La Fenaison, and The Man with the Hoe and The Gleaners, in the Louvre, make one think how weary the harvesters and laborers must get before sundown. In these, as in most of Millet's pictures, the impression of solidity and clumsiness in his figures is curiously helped by his style. He painted on coarse canvas with a well charged brush, laying on lumps of color. But he was not brutal, and the light that so often silhouettes his figures is very tender and gentle. We see this in The Shepherdess and in his best-known picture, The Angelus, in the Louvre.

PAINTERS OF NATURE KEEPING THE FONTAINEBLEAU TRADITION

A generation has passed since Corot and Millet died, both in the same year, but their spirit still lives among a certain class of painters in France. Cazin's beautiful and rather melancholy pictures of low-lying land have much in common with the work of Millet; Pointelin had something of Corot's love for the mysteries of half-light. Lhermitte paints working folk, strong, full of the dignity of hard work, but lacking the pathos and poetry of Millet's studies.

Among the many painters of the oaks of Fontainebleau there is Harpignies. His brush is very sure, and, unlike hard-working Rousseau, he knows what to leave out.

This group of nature-painters stand apart from the rest of French art. After them a great many changes and revolts were to come, and cleverness that got sadly mixed up with inspiration. When we are a little weary of the ways of modern French artists we can always go back with pleasure to Corot and Millet and their friends. It is like stepping from the noise of the highway into the enchanting greenery of Fontainebleau Forest itself, where beautiful things happen, where you may even see a shepherd boy in a blue smock sitting under a tree playing on a wooden pipe.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 2475.

FRENCH PAINTINGS OF OUT-OF-DOORS

THE SHEPHERDESS. FROM THE PAINTING BY MILLET

JEAN FRANCOIS MILLET'S HAPPY PICTURE OF A MOTHER AND HER CHILDREN

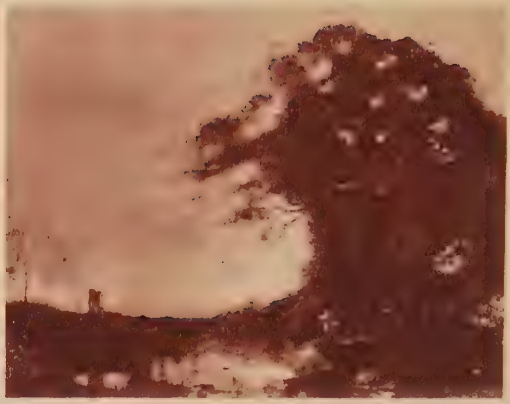
THE GREAT OAK. FROM THE PAINTING BY JULES DUPRE

THE POND. FROM THE PAINTING BY THEODORE ROUSSEAU

CHARLES FRANCOIS DAUBIGNY'S FINE PICTURE OF SUNSET

JEAN BAPTISTE COROT'S BEAUTIFUL PICTURE, THE BENT TREE

A BEAUTIFUL LANDSCAPE, BY COROT



EVENING, BY COROT

OXEN GOING OUT TO PLOW. FROM THE PAINTING BY CONSTANT TROYON

A FLOCK OF SHEEP ON A FOOTPATH, BY MILLET

THE STORM, BY NARCISSE DIAZ DE LA PENA

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MORE FURNITURE TO MAKE FROM BOXES

CONTINUED FROM 2266

THIS time you are going to learn how to make three different articles—a general-utility box which will be useful in several ways, a blacking box which will charm the schoolboy, and a wall-rack which will prove very serviceable.

To the average boy a coal box may sound rather uninteresting, but to the mother who knows the value of a good-sized box of this character it means a welcome gift. The charm of the box we are going to describe lies in the fact that it may be used for many different things—for coal, for paper, for odds and ends, for storing articles in the garret, when not in use, and, last of all, for blouses. However, it can hardly be put to all these different uses at the same time. And if Mother claims it for a coal box, don't suggest to your sister that she may use it for her blouses. If you want it for a window-seat, you may make a pretty cretonne cushion and use the box part to store pillows when not in use.

"A box, a box, my kingdom for a box." That is what the boys are saying these days, for box furniture is getting very popular indeed. You need not pay "a kingdom" for this box, for five cents will be all you have to pay the grocer for it. In fact, if you are on the right side of your friend the grocer, he may be glad to give you the box for a hearty "Thank you." You may also be able to find a box of the necessary size at a hardware or dry-goods shop. Ask for a medium-sized packing box or soap box, and measure it to see that it is about 12 or 14 inches deep, 16 or 18 inches wide and from 27 to 30 inches long. A very satisfactory size is 14 inches deep, 16 inches wide and 30 inches long.

The top should be the ordinary thickness, about ½ inch or more if it is to be used as a window-seat, 3 inches wider than the width of the box, and 3 inches longer than the length of the box. You see that you cannot use the cover which came with the box for the top. Measure the box on the outside when estimating for the top. If you want the box useful as a window-seat, be sure that the top is very strong. It is better to have it ¾ inch, or even 1 inch, thick.

Cleats for the under-side of the cover should be two strips ½ inch thick, 2 inches wide, and the length 2 inches shorter than the inside width of the box.

From the hardware store get one pair of 2-inch iron hinges (butts) with screws ⅝ inch long.

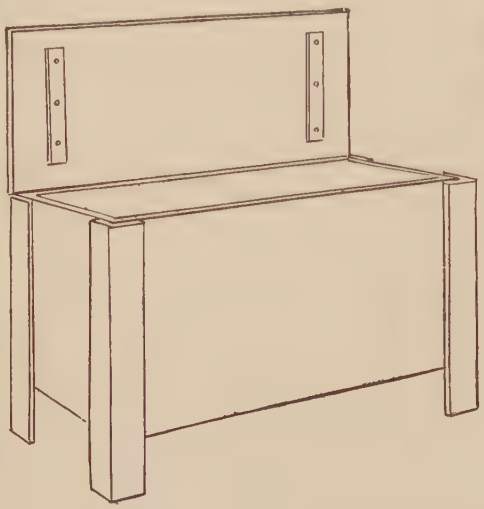
For the legs you need the usual four strips ½ inch thick, 1½ inches wide, and 4 inches longer than the depth of the box; and four more strips ½ inch thick, 2 inches wide, and 4 inches longer than the depth of the box, or about 18 inches long, when your box is 14 inches deep.

Last of all you need a hinge-strip ½ inch thick, 2 inches wide, and 3 inches shorter than the outside length of the box.

The list of materials needed may seem lengthy, but when you have everything at hand it will not take long to complete the box. The legs are made in the usual way, and then screwed fast or nailed to the corners of the box after the lid has been removed. Take care to keep the tops of all the legs even with the top of the box. The cover is made 3 inches longer and 3 inches wider than the outside width and length of the box. It may be made of three pieces of smooth wood butted tightly together, if you cannot find one board large enough. Place and nail the cleats on the under-side, placing each cleat about 4 inches from the end of the cover. The nails may be driven from the outside and clinched on the under-side of the lid.

Put the hinge-strip on the back of the box

between the legs, keeping the top edge even with the back of the box at its top edge. Place the cover so that it projects the same distance all around. Put the hinges so that they are 6 inches from each end of the box. The hinges should be placed so that they can be screwed to the under-side of the projecting back edge of the cover, and also attached to the hinge-strip on the back of the box (see illustrations). Carefully sandpaper the box and



fill with putty any cracks or holes. The box is ready for its coat of paint or for the stain.

If it is to be used as a catch-all box and seat, the top may be upholstered by spreading a few thicknesses of cotton batting over the board, and placing over the cotton a piece of unbleached muslin, which is drawn and tacked all around the edges. Over this may be fastened some upholstery material of fancy cretonne, denim or brocade; and this may be held by large-headed nails, which give a pretty finish at the edges. You may give it a tufted effect by driving large-headed fancy nails down through the material and into the top of the lid. To conceal the legs, material to match the seat may be gathered and fastened all around the top edge. The inside of the box may be lined with unbleached muslin tacked fast in the corners and to the inside edge near the top of the box.

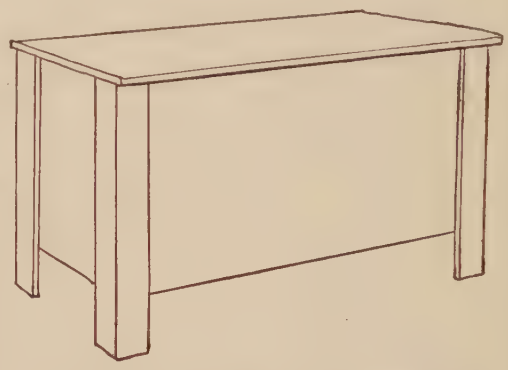
If placed near a window, it will make a most attractive window-seat, and may be made very comfortable and pretty with a few pillows. "Pigs is pigs," and coal boxes is coal boxes, except such as have been dressed up in fine style and are entitled to be called utility boxes and window-seats.

A BLACKING BOX

BLACKING shoes is almost fun when the blacking box is handy; and no trouble at all when, by merely lifting a lid, you find brushes, polish and all, including a brace to hold the foot so it will not slip. That is what you have in this design—a complete blacking box. The box is small enough to slip out of sight when not needed, and yet large enough to be of practical value.

For the main part you need one butter box about 5¾ inches deep, 13¾ inches wide, and 14¼ inches long. For the top you need two pieces of white wood ½ inch thick, each 1½ inches wider than half the outside width of the box, and 3 inches longer than the outside length of the box.

For the legs you require four strips ⅜ inch

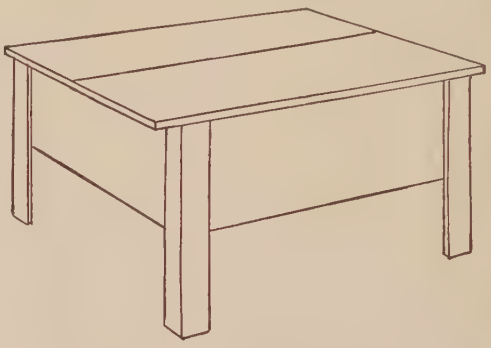


thick, 1⅜ inches wide, and 7 inches longer than the outside depth of the box; and four more strips ⅜ inch thick, 1¾ inches wide, and 7 inches longer than the outside depth of the box.

For the sole-block you need one block of wood 2 inches thick, shaped like the sole of a shoe. If you prefer, you may buy at the store a regular block like the bootblack uses.

In the line of hardware you need some screws and two 1½-inch hinges. The most desirable hinges for this purpose are the kind known as butt hinges.

Make the legs 7 inches longer than the outside depth of the box. The legs, you remember, are made by nailing together two strips, a narrow and a wider one, in such a way

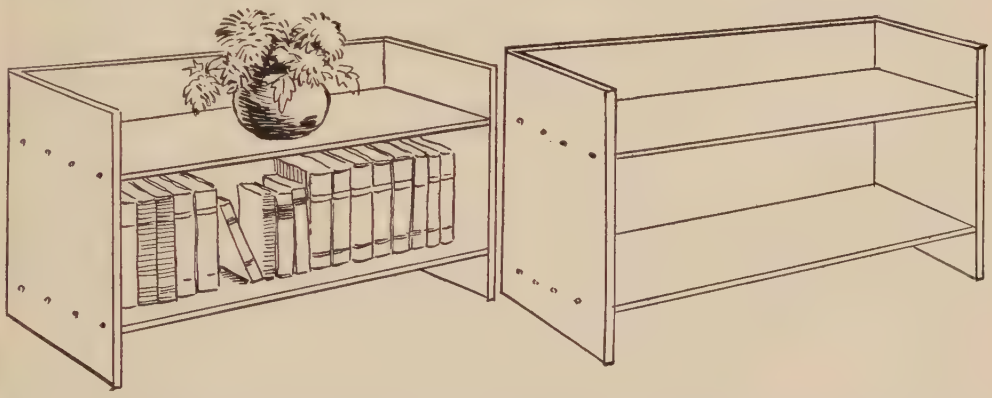


that a right angle is formed. Remove the cover, turn the box on end and nail on the legs. Now you may stand it right side up on the legs, and then nail on one part of the cover, allowing it to project evenly on the side and ends. You may hang the other half of the cover, placing the hinges in the joint between each half cover. Then, cut

the edges of each half cover to let the hinges in even. Nail the sole-block on the underside of the hinged half of the cover. When you are ready to use your blacking box, turn this hinged side over on the part that is nailed down, and place your foot on the block.

Your blacking box is now complete, and ready for the varnish if you care to finish it in that way. However, it is quite as useful, though not as pretty, if we leave it without a stain or varnish. Before applying the paint, if you decide to finish it in this way, sandpaper the box and putty up all cracks or seams. Then paint it dark drab, brown or olive-green. Two or three coats will be sufficient to cover the wood and give it a good appearance. If you use a prepared varnish, the weathered-oak finish is the most popular one. If your room is finished in white, you may make your blacking box match by applying two or three coats of white, allowing each to dry before putting on the next.

You will surely want a handy box, when you know how simple it is to put together and how inexpensive it is.



SMALL WALL-RACK

THERE are a hundred uses for a wall-rack. Placed conveniently over a desk, it will hold a number of reference books, and a bowl of pretty flowers on the top shelf. Placed in the sick-room, it will hold the medicines for the convalescent child, and a vase of fresh posies on the upper shelf. Placed in the kitchen, it will prove a great joy to the cook, for it is useful for holding the salt and pepper and the sugar bowl and the spice jars. These are merely a few of the uses of this rack.

Now you are ready for the box, and enthusiasm is needed in finding just the right kind of box for this rack. Hunt up your grocer and ask for a condensed-milk box. If he has not a box with that name, keep busy until you find a box that has the following dimensions—about 8 inches deep, 13 inches wide, and 19 inches long. You also want two picture hooks and some picture wire.

Carefully remove the cover and set it aside, for you will want it later. Take off both sides by withdrawing the nails, and cut off each end of the sides, making them the exact length of the box inside. Keep up that enthusiasm, for there is more work to do. With your pencil and ruler measure and mark on the two ends of the box a distance 2½ inches from the side edges. Set the sides in, keeping their outside faces on the pencil line, and secure them by nails driven through each end and the bottom.

Plane off all the edges necessary to make them even with each other, using sandpaper afterward to remove any blemishes. Bore a hole ⅛ inch in diameter in the centre of each end, 4 inches down from the top edge of the rack. Insert the hanging wires through the holes from the outside and knot their ends tightly.

USES FOR THE SMALL WALL-RACK

The wall-rack which has already been described may be used for a wall-bracket to hold a vase, if we hang it up from one end only. There is then room for a tall vase of flowers to stand inside. Holes are bored 2 inches from the side edge and 4 inches from the back, and wire is inserted.

This same rack may be used for a pipe-holder for grandfather. It is to be used on the wall in the same way as the vase rack by turning it on its end. A number of holes are bored in the top end ½ inch in diameter or just large enough to hold the stems of the short pipes. Little hooks driven in the back near the top will serve to hold the long pipes; while slight depressions gouged ½ inch deep on the inside of the bottom will hold the bowls.

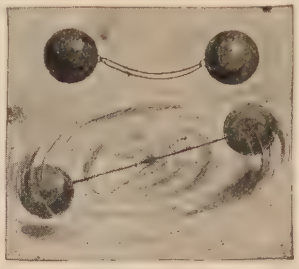
Would you imagine that one article could have so many uses? By making a few changes your wall-rack may be useful to the cook as a holder for spoons, knives and forks, salt, a rolling pin, and so on. With your pencil and ruler find the middle of the top shelf. Then measure off to the right and left every 2 inches, and mark the points on the edge of the shelf. Measure back 2 inches from the front edges of the rack and place six points 2 inches apart. Then bore two rows of holes ¾ inch in diameter. The centre of the first row is ¾ inch from the front edge. Cut slots ¼ inch wide from the front edge to the first row of holes. In boring the holes be careful not to tear off splinters, and as soon as the point of the bit is felt coming through the wood, take it out and bore from the other side to make your holes smooth.

THE WOODEN BALLS THAT TWIST AND TURN

THERE is a simple toy which a boy or girl can make quite easily at practically no cost, which gives a great deal of fun and amusement, and which illustrates a number of important scientific principles.

To make this toy all we need is two wooden balls, an elastic band and two small iron staples. The balls may be the two wooden balls that are found in a set of ninepins. Their size may be almost anything, but for practical purposes it is well not to have them more than 2 inches in diameter. Of course the larger they are, the thicker and stronger must be the elastic band which will make them whirl.

We slip the ends of the elastic band into the curve of the staples, and then drive these staples one into each ball, as shown in the first picture. The toy is now ready for use.



The whirling balls.

To make the balls whirl round of their own accord, we take one ball in our right hand, and laying the other on the table or floor, we twirl it and the elastic band round and round by rotating the hand rapidly. After a moment or two the elastic band will be twisted and wound up to its full extent.

We now catch hold of the free ball with our other hand, and then, while they are lying on the table, let both balls go together. They will begin to whirl round with ever increasing speed, and after a time will come to a momentary stand, and then turn in the opposite direction, the process being repeated until at last both balls come to a standstill.

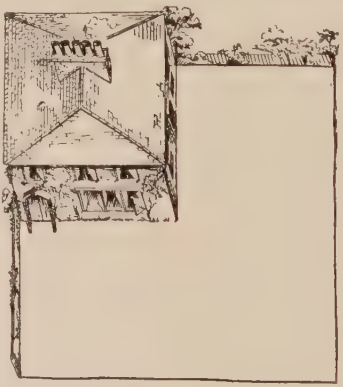
When they begin to move after being set free, the motion is given to the balls by the elasticity, and is an instance of what is known to men of science as *torsion* and *tension*, torsion meaning "twisting," and tension "stretching." The speed gets greater and greater owing to the momentum of the balls, that is, the quantity of motion they have. This momentum causes the balls to go on rotating even after the elastic is untwisted, and the result is that the elastic goes on twisting in the opposite direction, and the process is repeated again and again, until at last the energy which we communicated to the balls when we first of all twisted the elastic round and round, and which was stored up in them, is completely exhausted, and the balls come to a standstill.

While the balls are whirling round, it will be noticed that they get wider and wider apart, until they have gone to the full extent of the elastic. The balls fly outward by what is known as centrifugal force, which is the force that causes all bodies rotating round a centre to tend to fly off in a straight line. This simple toy, therefore, has illustrated to us quite a number of important scientific principles, and we can experiment with it as well as play with it.

For purposes of mere amusement we can color the balls, making one white and the other blue or red or black. The effect as they whirl round and round will then be heightened, and some very pretty appearances will be obtained. The elastic which we use should be the round kind rather than the flat, as the former twists much more evenly.

HOW DID THE FATHER DIVIDE HIS GARDEN?

A GENTLEMAN, who was a merchant in the city of London, decided to live a little way out in the country, where he could have a larger garden than could be obtained in town. So after looking about for some time he found a very nice house with a fine garden, and the house stood on one quarter of the ground as seen in our bird's-eye view of the place. After taking his wife to see the house, the merchant bought it and soon moved with his family to the new home.



This gentleman had two sons named Harry and Leslie, and two daughters, Doris and Gertrude, and they were all very fond of gardening. They at once asked their father to divide the garden up among them and to allow them to cultivate it. When the summer came they would see whose particular part had the best show of flowers and who was the best gardener.

The father readily agreed, for he knew that his children would do their best, and this arrangement would save him the trouble and expense of engaging a gardener. Besides, it would provide plenty of healthy recreation for their spare time, and so he said he would divide the garden up into four parts of equal size and shape and give one to each.

The boys and girls could not see how their father would be able to do this, because the garden was already such an awkward shape that it did not seem at all an easy matter to divide it as he said. But the gentleman did it, and the boys and girls agreed that it was really very simple after all. How was the garden divided as the father promised?

THE ANSWER TO THIS PROBLEM IS IN THE SECTION BEGINNING ON PAGE 2511.

A CHRISTMAS TREE FOR THE BIRDS

CHRISTMAS would not be Christmas without a Christmas tree. But have you ever thought, when you have been enjoying yourself, that the winter, which brings lots of fun for all of us, is a very uncomfortable time for the poor things who have no warm homes?

Perhaps on some cold morning you have looked out of your window and have watched the birds flying about among the bare branches of the trees in the garden, searching the ground in the hope that some kind person has thrown out a few crumbs for them?

Have you not sometimes wished there was a Santa Claus to bring a tree full of good things for the birds? Perhaps it never occurred to you that *you* might be the birds' Santa Claus? Well, you shall learn how to make a Christmas tree for those poor little mites.

First, you must get a small fir tree that can be put into a pot. Probably you will find one in the garden, and will be allowed to dig it up. If not, you can buy one about Christmas-time for a quarter.

When you have planted your tree in a large flower-pot, get some small baskets—the tiny ones that candy is sold in will do splendidly—and tie these baskets to the branches of the tree. You may put all sorts of things into these baskets—bread-crumbs, nuts, little pieces of crust or toast from the breakfast table, or some of the seeds that are given to tame birds.

Then hang up tiny pieces of coconut. These are for the tomtits, and there is nothing that they like so well. Other birds are very fond of little pieces of suet.

You can make your Christmas tree look pretty with some bright pieces of cloth and ribbon, or with colored paper made into little bags to hold bread-crumbs. When it is quite finished, put it out in the garden or on the window-ledge of your own room. At first the birds will not understand, because nobody has ever taken the trouble to make a Christmas tree for them before, and perhaps they will think it is some sort of trap. But presently some of the bravest ones will come. Then you will see them perch on the branches and look around in every direction to see if there is any danger.

You can watch them through the window, and they will not be frightened if you do not move. As long as you keep quite still, they will not think you are going to hurt them. In a little time the birds will put their little heads in the baskets and give a little twitter of delight when they find the good things there. Other birds will be watching them from the trees, and when they see that the braver ones have not been hurt, they will come too. When the tree has been out a little while, you will see perhaps forty or fifty birds of all sorts fluttering round it.

When they have eaten everything, refill the baskets. Then next morning put the tree out again, and you will be surprised to find that all the birds will be waiting. They will have told all their friends, too, and those who came the first day will have been spreading the news of the wonderful tree for miles round.

If you watch them carefully, you will find that you can recognize many of them, because there is just as much difference between birds as there is between people, if only you look at them closely. And they have all sorts of different characters, too. Some are quarrelsome and some are timid. Some try to push the other birds away when they have found a little basket full of good things, and others

A Christmas tree for the birds.

are generous little fellows who call the others to help them enjoy anything very good.

If you put your Christmas tree out every day for a week, you will find that by degrees the birds grow more and more tame, till at last you can stand quite close to the tree and watch them. If you are careful—the great secret is never to move quickly—the robins, which are the boldest of all our birds, will learn in time to take bread-crumbs from your hand. But you must not be surprised if they will not do this at first, because you must remember that you seem great giants to them, and some people are so cruel that you must give them time to learn to trust you.

For those who live in a part of the country where much snow falls, making a Christmas tree for the birds will be more than an act of great kindness on the part of the boy or girl who loves feathered friends. It may save many birds from starvation.

THE WIZARD'S POCKET-HANDKERCHIEF

ON page 1775 we learn how to "lose" a coin from a handkerchief. In this case a coin is likewise made to disappear, but after quite a different fashion. The handkerchief used is a colored one, and the wizard's own property. We will suppose that the trick is to be performed with a quarter. The conjurer gathers up the four corners of the handkerchief, as in picture 1, and has the quarter dropped into the sort of bag thus formed. He proves that the coin is really there by making it chink against the table-top, or allowing somebody to feel it through the handkerchief. But presently he says: "Quarter, vanish!" or something to the same effect, and the coin forthwith departs. The handkerchief is shaken out, but nothing falls. But the performer explains that the coin has merely stepped round the corner and will come back again if desired. Again he gathers up the four corners of the handkerchief and says: "Quarter, come back!" Again he makes it chink upon the table and allows anybody to feel that it has really returned. He now says: "Quarter, pass into that vase upon the sideboard!" or any other place he likes to mention. Once more the coin has disappeared and is found where he has told the audience that it would go. The secret here lies in the handkerchief, which is one that has been specially prepared for the purpose of the deception. If the young reader is a boy, he will have to get the assistance of some relative—a sister, a cousin or an aunt—to make it; if a girl, she can do the needful work for herself.

1. The handkerchief held by the four corners so as to form a bag.

The pattern of the cloth of which the handkerchief is made does not matter, but it must be double, being in fact two handkerchiefs of the same pattern sewn together all around the edges, save for one small opening. This is at the corner *B* in picture 2, where for a space of 1½ inches each way the two handkerchiefs are not joined together. This leaves a space between the two handkerchiefs, and this space is the secret of the trick. The two handkerchiefs must also be joined together by a diagonal line of stitching from the bottom of the opening at *B* to a point an inch short of the *C* corner. As it is important that this line of stitching should not be noticeable, the handkerchiefs used must be somewhat dark in color, and the more intricate the design the better it is.

2. The secret of the magic handkerchief.

When it is proposed to show the trick, the first step is to hide a quarter beforehand in some convenient place to be found there when necessary afterward. The handkerchief must be held in the first instance spread out four-square, the corner *A* between the thumb and fingers of the left hand, and the corner *B* between those of the right, but with the little mouth at *B* kept open by inserting the tip of the forefinger in it. The performer then gathers up the other corners one by one into this same hand, forming a sort of bag, as in picture 1. He then asks someone to lend him a quarter, and to drop it himself into the bag thus formed, in reality offering him the opening at *B*, so that the coin actually falls into the space between the two handkerchiefs. To avoid mistake, it is well, for the moment, to hook both forefingers into the opening. The coin may now be made to rap upon the table, or be felt through the handkerchief. This done, the performer lets loose the corners *C* and *D*, but nothing falls, the quarter running down the line of stitching to *C*. By again picking up the four corners, the coin is brought back to the centre.

The performer now orders the quarter to go to the spot where he has placed the duplicate coin, and once again shakes out the handkerchief, four-square. He then drops the corner *A* and with the left hand takes hold of the corner *C*, holding the handkerchief straight up and down, and giving it a shake as if to call attention more forcibly to its entire emptiness. While the attention of the spectators is occupied in seeing whether the quarter has reached the place named, he works the first coin through the opening into the left hand and gets rid of it.

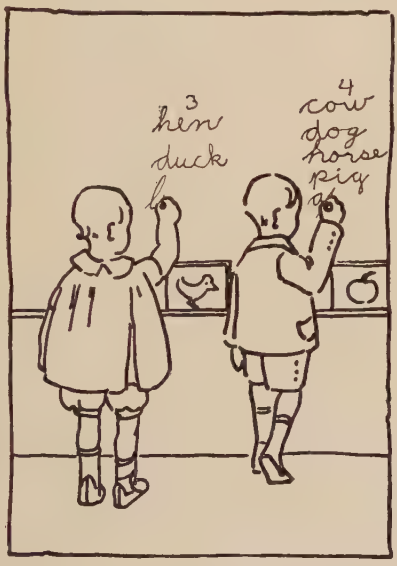
If you perform the trick neatly, you may be asked to do it again, but it is seldom wise to do a trick twice over before the same spectators. Should anyone press for an encore, your best plan is to exhibit instead some trick more or less resembling the first one. In the present case, the disappearance of the quarter makes a capital introduction to that of a coin, as described on page 1775. You agree to "do it again"; and this time you say you will use another coin and somebody else's pocket-handkerchief. You keep your word—that is, you again lose a coin from a handkerchief; and the trick being the same *in effect*, the audience does not realize that it is really a different one.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 2511.

MORE WORTHWHILE GAMES

CONTINUED FROM 2273

WRITING GAMES—A NEW WORD FILE
READING IN BOOKS—PRACTICE GAMES IN READING



I EXPECT you can tell every word in your dictionary by this time. I wonder how many of them you can write. A good many, I am sure. Let's find out just how many. You and a playmate take any ten words from the dictionary which you think you can write. Each put five of them in a pile in front of you at the blackboard or easel. Put the picture side up.

Look at the first picture and write the word. Then look at the back of the card to see if you had it right. If you did, score yourself and put the card at the back of your playmate's pile. He will put his at the back of your pile.

If either of you wrote your word wrong, rub it quickly off the board or mark it quickly off your paper. Then trace it and write it again, but do not score.

When you have finished your piles you will each have written all ten words. Your score tells you how many of them you wrote

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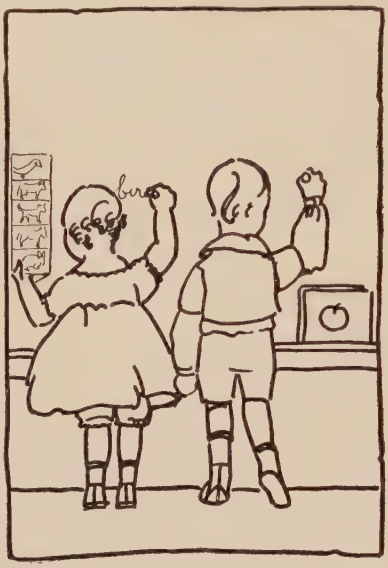
right the first time you tried. Look carefully at the words you rewrote. If you are not quite sure about them now, you better practice them again before you begin the next game, so you will be sure to score better. You want a Just Right score, don't you?



WHENEVER you think you can write about the animals or the colors or any other words, here are two ways you can test yourself and find out how many of them you can write.

Take from the dictionary those cards you think you know. Put them picture side up. Stand them on the ledge of the blackboard or easel. Think what the picture says. Write the word. Put the card at the back of your pile. Write what the next one says. Put that at the back of the pile. Keep on until you write the word that belongs to each picture. Then turn your cards over and look at the written words, one after the other, in the same order as you wrote them. If you wrote the first word correctly put the card in the "Right" pile. If not, put it in the "Not Right" pile. Count the number you have right. Put down your score. The "Not Right" pile tells you which words you need to practice on. The little boy you see in the picture on this page is using his dictionary cards this way.

The little girl in the picture is using a practice game to find out how many of those words she can write. She folds each card so she can't see the words, and she writes what each picture says. Then she opens out the word part of the card and corrects her work and scores the words she has right.

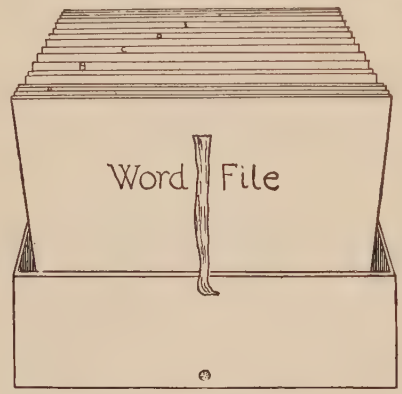
Perhaps it will be most fun, just at first, to practice alone, with the word cards from your dictionary. When you score well in these you can play many writing games with the other children, using your blackboard or your easel.

THESE children are playing Three Deep. You see there are two children in each line and one extra child besides. The extra child is IT. He may run to the back of any row he wishes and make that line Three Deep. If the first child in that line sees him coming he may run out of his line and to the back of some other line, making it Three Deep. But if he doesn't see the child coming in time to get out of his line before it gets Three Deep, he must take a forfeit from the forfeit box. Then he runs to make some other line Three Deep.

When you begin your game, put some buttons or stones or something you can easily carry in your hand, in a box for forfeits. Then every time your line gets Three Deep when you are at the front of it, you have to take one of the forfeits from the box before you can take your turn as IT. At the end of the game count the forfeits you had to take from the box. The child wins who has the least forfeits.

THESE children are playing another kind of Three Deep. There are two children in each line and an extra child in the middle who is IT. In front of IT on the blackboard ledge or easel is a pile of word cards from the dictionary but they are hidden behind a cover card. The child who is IT looks behind the cover card at the first picture and writes the word it says. The other children may say the word just as soon as she stops writing. As soon as she hears the right word, she steps to the back of the line which said it first. That makes Three Deep, so the leader of that line is IT and takes the next turn in the centre. If nobody in either line can read the word you write, you take the card for a forfeit. The one with the least cards at the end of the game is the winner.

Three Deep is a speed game because everybody plays just as fast as he can. Whenever you can write words well enough to score Just Right in a test, you can play Three Deep with those words. You want to be sure you can do things right before you try to do them fast. So for any speed games in writing be sure you use only the words you have scored right. You don't run races until long after you know how to run. And you don't play racing games with writing until you are sure you can write the words right. Keep on practicing your writing and we will learn some more speed games before long.



WHEN you write stories you use words like these: is and can did will I you. We can't make pictures for them. You learn what they say because they are used so many times with the words you do know and can find in your dictionary. But when you want to write these words in your stories, you need a word card to trace. Make these word cards the same size as your dictionary cards.

You can make a file box for them. Make it just as you did your dictionary box. Make the letter cards just the same only use pink instead of blue cards so you can easily and quickly find whichever box you need to use. In this file you will not have file cards like those in your dictionary. But you will have one extra card in front of each letter card. Make it five inches by nine inches, so it will stick up above the word cards. On each of these cards put one of the capital letters from pages 91 and 92 of your Work Book. You use these capital letters in your name and at the beginning of every sentence you write. If you trace them several times you will find you can write them just as well as the small letters.

When you put this file together, fasten the punched letter cards in, just as you did your dictionary ones, first a then b then c d e f g h i j k l m n o p q r s t u v w x y z and Out of Place. Then place all the

words like can come came in front of the c card, and with them put the taller card with the capital C on it. Do did don't and the capital D card in front of the d letter card, and so on.

These are some of the words I think you will use oftenest in writing your stories: the we it were was is in. See how often you can find them in these stories which children like you have made up.*

Yesterday I played in the house because it rained, and in the afternoon a little girl and her mother came to see me and we had ice cream.

Yesterday we went out to pick flowers and two cows frightened us and we ran home like everything.

I have a little baby at home. His name is Jimmy.

Yesterday my four cousins came to see me. We played games.

When I go home from school I do the errands. I come right home from the store. Then I ask mother if she wants me to help her. If she says "No" then I go out to play.

I have a little "Polly" at home in my room. He screeches and wakes me up every night. Then I have to give him a cracker. My baby says "Polly wants a cracker."

* From Mahoney, Standards in English. Copyright, 1917, 1919, by World Book Company, Yonkers-on-Hudson, New York.

My grandmother has a dog. His name is Duke. He is brown and white. When I pick up stones he comes near me. When I throw them out in the street he runs after them.

In the picture I see a little girl. She is on a swing. Her dress is white. I know she likes to swing because she is laughing. I am going to call her Margaret. I think she is three years old.

I have a buttercup. The buttercup is yellow. It grows in the field. It makes your chin yellow. That means you like butter.

The snow is falling. The flakes are white. They are like stars. Yesterday we made snowballs and a snow fort. We made a big snow man too.

I went in a sail boat and sailed to a light house. My father and mother went with me, and my little baby was crying. The boat almost tipped over. My baby almost fell out, but my mother caught her and I was laughing all the time.

To-day I saw a runaway horse. Two men were trying to catch him, and another man in a team got in front of the horse and stopped him. Then the two men caught him and took him to the barn.

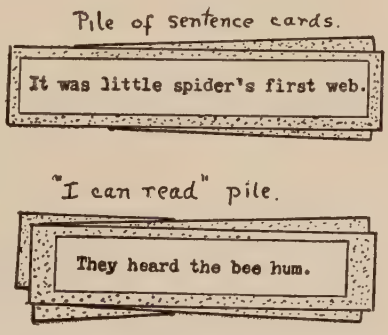
IF you want to use a word in your story, first look for it yourself. If it is a word you can picture, it may be in your dictionary. If not, look in your pink file to see if you have used it before and

put it there. If it is not there, ask mother to write it for you, so you can trace it. When you have written it in your story, put it in the right place in your pink file so you will find it there the next time you want to use it in a story.

WHEN you can read well enough to score well in all the reading games, try reading in a book. Get an easy one first, and one which doesn't cost very much so you can buy three copies, one to read and two to cut up for practice games.

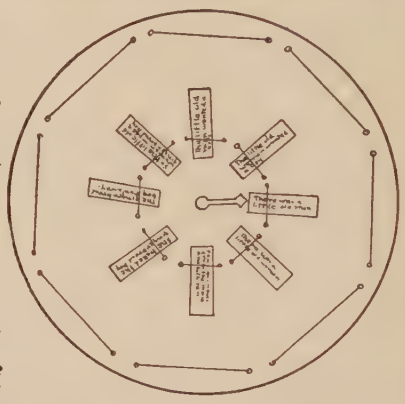
In the very first story you will find many words which you already know. When you come to one you do not know, first look in your dictionary to see if you can find out what it says. If you can't, ask mother or someone who does know it. Look at it carefully so you will remember it again. If you should forget, look back at this same page and you will remember the story and the story will help you remember the word. Then you won't have to ask mother again.

When you have read the first story clear through, here are some cards you can make up for practice games. Cut the pages of the first story from one book. Trim the edges neatly. Mount each page that is numbered 1 3 5 7 9 and so on. Mount it on cardboard. Then cut the pages of the first story from the other book. Mount on cardboard the pages that are numbered 2 4 6 8 10 and so on. Cut the sentences apart and you have the whole story cut up. There are many games you can play with these cards.



The first game is a sorting game. Mix the cards up and see how many of them you can read. Put those into a pile and call it the "I can read" pile. What is your score the first time you try? Never mind if you can't read them all. It is ever so much harder than reading them in the story. Go back now and read the story again. Then match each of the cards you could not read to the same sentence in the story. You will know now what it says for the story will help you.

THE next game takes two people, perhaps your friend Jim and yourself. Choose a story you have both been reading in your book. Jim reads from the book one sentence and waits for you to find the card that says that. Then he reads the next sentence and waits for you to find that card and put it under the first one. When he has read the whole page and you have found the cards, he will put the book down by your cards, and together you will correct and score your work. Then you will change places. You will read Jim a page from the story and he will find the cards. Sometimes it is fun to begin with the last sentence at the bottom of the page, then the one before it and so on to the first sentence at the top of the page.



YOU can play with a playmate, using the big wheel. Each of you will read the card the spinner points to. If both of you are not sure of what each card says, better look in the book and the story will help you to remember.

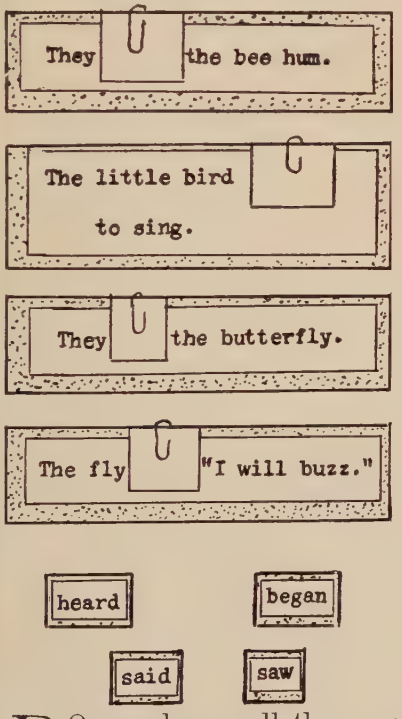
SOMETIMES the same phrase or the same sentence comes over and over again in the story. If any of these puzzle you, here is a good game. The children call it the Page Line game. Ask mother to tell you just what the sentence or phrase does say. Then you take the card and keep saying this over and over while you try to find it on every page in the story. Whenever you find it, put down the page and the line where it is on your paper. If mother will make you a correction page to tell you every place it comes in the story, you will know how to score. Every one of your numbers that says the same as mother's will be right. If you practice the Page Line game you will soon find the sentences that were so puzzling do not puzzle you any more.

Page	Line

IN the back of the book you will probably find a list of all the words that are in the book. Mother will help you find out which ones belong to this story. Cut them apart carefully and mount them on cards so you will not lose any of them.*

Page	Line
2	5
3	2
3	7
4	1
4	5

Now take your sentence cards. Find a card that has your first word in it. Cover the word up with a piece of paper and a paper clip. Then find another sentence which has the next word in it. Cover it up. Do this until you have covered one word in each sentence, one for each word you have a little card for. Lay aside the rest of the sentence cards. You won't need them for this game.



Does this picture tell you how to play the game? You read each sentence and think what word is hidden. Find the word card to put there. When you have finished look at the hidden words and see if you put the right ones there. What is your score? In this game you have to know the story, to know what the sentence says even if one of the words is covered up. And you have to know the words so you can find the right one to put in each sentence.

DO you know all the words in your dictionary? Do you know all the words in your pink file too? Can you play reading games about them? Then I am sure you can read easy Primers.†

*Note to Parents: If the list is arranged alphabetically instead of by stories, you will have to go through the list checking those that occur in the story the child has just read.

†Note to Parents: The following Primers are recommended:

New Barnes Primer	A. S. Barnes and Company
The Here and Now Primer	E. P. Dutton and Company
Elson Runkle Primer	Scott and Foresman Company
The Fun Book	Macmillan Company
Everyday Classics Primer	Macmillan Company
Bolenius Primer	Houghton Mifflin Company
Reading Literature Primer	Row Peterson and Company
The Modern School Readers Primer	Harr Wagner Company

Try the first story in your book. Can you read it? See if you know all that it said. Ask mother to test you. She will ask you questions about the story. Keep score. If you can't answer all of the questions, ask mother to write down those you don't know about. You can read the story again and find out what the answers are. Remember to score only when you know the answers the first time mother asks them. Then read the next story and ask for another test.

WHAT HAVE YOU LEARNED?

CAN you write so the other children can tell the words you have written?

How many words from your dictionary or pink file can you write that well?

How many words are in your pink file?

Can you write all the capital letters?

Can you find the words in your dictionary or pink file, when you want them to use in your stories?

Can you make up stories and write them so the other children can read them?

Can you read the stories the other children can write?

Can you read in easy story books?

Do you know what you have read about?

Can you read well enough to answer mother's questions when she tests you on the story?

THE NEXT HELPS TO LEARNING ARE ON PAGE 2519.

The armadillo in his coat of armored hide.

LIVING FOSSILS

CONTINUED FROM 2220

THE extreme development of some one faculty in the human brain may give its owner what we call genius. The extreme development of some physical quality in a line of animals may result in life forms which are fit for their surroundings in the same way as the abundant talent of the gifted human creature.

Generally genius pays heavily for its endowment; special fitness in animals always does. The genius may be helpless unless he lives in surroundings which fit him; the specialized animal is dogged by death or threat of destruction unless the conditions to which it is adapted continue unchanged.

It is with this thought that we approach the extraordinary animals with which we are about to deal. Their name in science is the Edentates; that is, animals which have no teeth, or inefficient, peculiar teeth. They are the sloths, the armadillos, the pangolins and the ant-bears.

In the whole assemblage there is not a single permanent front tooth. In one or two species there are baby front teeth, but they never cut the gum, and disappear when the true teeth supplant the milk teeth. This, coupled with the strange method of life to which these animals are committed, is a very remarkable example of specialization.

The sloths are unable to live anywhere but up in the trees; the ant-eaters are compelled to depend entirely upon a diet of ants; the armadillos and the pangolins have the least hazardous prospect. One would prefer the chance of a rat or a rabbit to the hopes of the brightest of these Edentates.

Specialization may mean degeneration and ultimate ruin. A poet may starve and die unheard and unhonored in a rich unromantic industrial centre; an Isaac Newton's genius would not preserve his life in the midst of a cannibal horde. And a sloth, one of the masterpieces of nature in a particular way, vanishes from the scheme of life if a company of pioneers comes along with axes and fells the trees.

There is no home for a sloth but a tree, no way but one in which it can live and climb and feed in that tree. There is nothing like it; there is nothing more positively doomed to extermination. It is the old story repeated in another form. The ostrich, the moa, the dodo, the great auk, the penguin cannot fly; snakes have no legs; some of the moles have lost the light of their eyes; the giraffe cannot feed from the ground and perishes of starvation if driven from tall trees. Something

wonderful happened in each of these cases.

Each type of bird and animal named prospered for a time by virtue of unusual expertness in a limited direction. It lost what the others never let go. The great fish in coats of mail like medieval knights are but a legend to us, found only in the rocks. The shark, which never specialized in individual directions, yet bestirred itself to combat all, survives—the fittest fish in the seas.

Genius comes but once in an age, and leaves no successor. The work of the world has to be borne by the generalized, hard-wearing, all-round type of men. Not that we do not admire and reverence genius; we do, and deplore its passing. But there is a likeness between a mind which excels all others of its time and the animal which is equipped with unique narrow excellence for an immediate pursuit and then dies out.

THE STRANGE FAMILY STORY WHICH IS WRITTEN IN BONES

Why should the absence of teeth, so essential to the rest of life, be a qualification? It is a question not to be attempted here. We know that these animals with which we now deal have this peculiarity. The earth is stored thick with their bones. Originally they must have had great advantages over other forms of life, for they produced the most astonishing gigantic forms. If all the evidence of their existence were not available for our study we could not force ourselves to believe in their having existed. But there is a thrilling story to tell, as we shall see.

Let us, however, summon evidence from existing witnesses. The sloths shall tell us the story of their lives. There are only three species to-day, with several local races; and they group into two sections. The first is the Three-toed Sloth, the second is the Two-toed Sloth. None of them, as we have seen, has any front teeth, but they do have teeth corresponding to canines and molars. As their habits agree pretty closely, we may consider them all together, noting differences as we go.

They are furred, of course; they have small round heads with puny brains; dim, reddish eyes; poor hearing; but apparently an active sense of smell. The hind limbs are shorter than the front. In the Ai, which is the native name for the three-toed, there are three toes to each foot. In the Unau, or two-toed, there are three toes to each hind foot, but only two to the front.

THE CLUMSY CREATURE THAT WALKS A YARD A MINUTE

But it is absurd to talk of feet; there is no sole to a sloth's foot, no palm to its hand—if we may call the fore-member a hand. The limbs end in horny hooks, living grapnels, devoted solely to progress among trees. Set a sloth on smooth ground and he could make little more progress than a manatee. When he does descend from his perch he pulls himself along. He looks out for some roughness in the ground—a root or an upstanding stone—stretches out a front paw, grips it, and so hauls himself a step forward.

It might make a fair race to pit a snail against a sloth. The sloth's best-known record is 500 yards in about eight or nine hours. In the trees he mends his pace. Even there he is as deliberate as a chameleon.

He hangs himself up by his four hooks, with his support always above him. There he gathers leaves with his tongue and lips and gravely munches them. When he has to move on he puts out one front foot, and clinging fixedly with the other three, waits till he has grasped a new bough before letting go a second paw. Should he fail in this, he can haul himself up by the hind limbs.

In thick forest lands, where the wind blows, he will march from tree to tree without descending, the gale bringing opportunity to him by blowing the next branch in his direction.

HOW A TINY PLANT MAKES ITS HOME ON THE COAT OF THE SLOTH

There was a belief at one time that a sloth is born in a tree, stays in that tree, and dies in it rather than move to another. But he does come down and shift quarters, scrambling down the trunk and ascending in the same way, by grasping the bole with his grapnels. Moreover, there must be a trace of adventure left in the family, for Bates, the great traveler, once saw a sloth actually swimming a river some three hundred yards wide. That sloth went into the cooking pot of Bates's natives, so he would have been safer had he been more sluggish and stayed at home.

Melancholy and inertia seem the lot of these very strange beasts of the South

The Pangolin in two characteristic attitudes.

The Aard-vark and its young feed at an African ant-hill.

The Two-toed Sloth, or Unau.

The Three-toed Sloth, or Ai.

American forests. They are so slow, so plant-like in their unhasting ways that Nature makes them a lodging for a vegetable parasite. An alga grows on the hair of sloths. It is not merely scattered on the surface of the coat, but is definitely attached to individual hairs, rooted, as it were, in the fluted grooves which a magnifying glass shows us on each hair.

NATURE'S DEVICE FOR MAKING THE SLOTH ALMOST INVISIBLE

And this is not peculiar to an individual sloth or to one species. All sloths are disguised in this way, but there is one alga for the three-toed and another distinct alga for the two-toed.

When it wishes to sleep, the sloth may betake itself to the fork of the branch on which it feeds. Sometimes it dozes hanging by all fours, with the head pressed down on the breast between the front legs. This seems to imply helplessness and danger to the sloth. It is fairly safe as long as man and his ax and weapons keep away. The color of the coat, aided by the growth of algæ, makes the sloth appear almost invisible or like a part of the tree. It looks like a growth upon a branch, such as is common in these luxuriant forests. Men have watched for hours without detecting that they were in the presence of one of these fascinating fossils. It is as living fossils that we must regard them, relics of a great race.

THE PUNY DESCENDANTS OF THE GIANTS THAT ONCE LIVED

These relics are the petty remainder of an enormous issue. They are the poor relations of the giant ground sloths. Some were terrific, ponderous beasts, vaster than anything that treads the earth to-day. They belong to a past age, but it happens most romantically that we have been brought nearer to them than to many other of the old-time wonders that ancient men knew.

One of the grandest triumphs of Sir Richard Owen was the working-out of clues to a mystery brought from Patagonia. Thigh bones three times as thick as those of any elephant that ever lived were found. Other bones were incredibly huge, ribs and skulls that seemed more like rock formations than like parts of an animal that had lived and moved. There were so many of these remains that Darwin declared the soil of the South American pampas to be one great graveyard of them.

Owen pieced the dead dry bones together and seemed almost to make them live. He showed that these bones were the bones of giant sloths. The animals had been eighteen feet and more in length and many tons in weight. They had no front teeth; they had claws like present-day sloths' claws but of colossal size; they walked on the sides of their feet as sloths do now. They had gigantic tails and used these with the enormous hind legs as tripods so that they could squat and then seize a tree and pull it down in order to feed upon its foliage. If the tree was too strong, their terrific claws enabled them to dig up the tree.

ANIMALS THAT WERE BIGGER THAN ELEPHANTS

There were so many of them, and they were so large, that they must in the course of ages have leveled whole forests. The very sight of such beasts must have been appalling, for their size excelled that of the greatest elephants; but man is a creature of uncalculating daring: men kept these strange creatures as we to-day keep cattle.

It sounds like guesswork romance, but it is all true. At the beginning of the present century something happened unlikely enough to make a capital adventure tale. Explorers stumbled on a great cavern in southern Patagonia which had been a giant sloth stable.

Part of it must have been at one time open, for rough huge walls of earth had been thrown up. In the cave there were signs of three different periods of occupation. There were traces of the bones of llamas, of an extinct species of bear, of an extinct great cat matching in size our old cave lion, of an extinct horse, and feet upon feet of evidence about the giant sloth.

There were the remains of at least seven specimens down among the dust and débris from other days. Naturalists were able to read their story from them. They could trace vestiges of flesh and muscles; they could tell that one animal had been slain by a blunt instrument, probably a flint ax; that its skin had been taken off either by a pointed wooden spear or by a flint skinning-tool. For parts of the skin were there, fresh, unperished. A piece brought to the British Museum, when submitted to hot water, gave out its glue: there was gelatine still in the bones.

But more wonderful still, there was the very food that these monsters had eaten. The undigested masses remaining showed grasses, twigs and various other growths easily identified. Above all, in the cave, burying these remains, were deep heaps of hay which the old keepers of the giants had cut as fodder for their captives.

AN AMAZING GLIMPSE AT THE WORLD IN THE VERY LONG AGO

We had all thought that South America had no human history, but here in a flash a marvelous picture started into being, showing that these primitive men, with nothing better than sticks and flints for tools, mastered the mightiest animal of their time in the New World; led it captive, stabled it, fed it, killed and ate it, perhaps as we stable and eat our own cattle to-day.

The portions of skin which were found were full of nodules of bone, not on the surface, as in the armadillos, but beneath. There was hair, coarse and strong, like modern sloth hair, upon the surface of the hide. It was all so fresh and seemingly modern that a distinguished scientist said to a gathering of scientists: "It is possible—I will not say more—that the giant sloth still exists in some of the mountainous districts of Patagonia."

THE GREAT RACE OF GIANT SLOTHS ONCE LIVING IN PATAGONIA

An expedition went out to seek, but found only native rumors. The remains have been marvelously preserved by the special properties of the air of the cave. They appear as of yesterday—the skin, the bones, the food—but really they belong to the long ago, and probably we shall never know more of the giant sloth than their skeletons teach us.

Why millions of giant sloths died out and littered the soil with their skeletons we can never know. The fact that men appeared in their midst must have had some effect. One cave accounts for seven. How many men in how many caves also destroyed them through the ages cannot be known. But the meaning of that scene cannot be forgotten.

There is no such tale of wonder to tell of the Ant-eater, but this class of animal warrants a pause, even without such an appeal to history. For here we have the specialization carried to its extreme limit. The sloths have grinding teeth; the ant-eaters have no teeth of any sort.

The ant-eater's mouth is a masterpiece of eccentric architecture. It is simply a long cylinder, opening only near the end. Through this opening darts a long, sticky, worm-like tongue to entrap ants. The hair on the body is long and coarse. The tail of the Great Ant-eater is immense and bushy, and when the animal lies down, this member covers it like a spreading tent.

THE TERRIBLE CLAWS WHICH HELP TO GET FOOD

But in addition to the coarse hair and the absence of teeth, we have a further likeness to the sloths in the claws. They are admirably fitted to break down the fortresses of the termites, often called white ants. Into these nests these animals must break to obtain a meal. The claws must not be walked on by these animals any more than by sloths, or they would lose their ripping qualities. So the animal trots along on its knuckles and toes side-footed.

The little ant-eaters which live in trees and hang by their tails claw open the earth-nests built by termites up among the branches. They can strike ugly blows with their grapnels; but the great ant-eater, the beast that keeps to the ground, is a fierce fighter. It is inoffensive unless it is attacked, and then it is mischief four-handed.

Bates, the explorer, was glad to eat ant-eaters, for his food had little variety. The natives kept him supplied till one day his huntsman came in shrieking that an ant-eater had slain his best dog. Bates went to the spot, and there lay the two animals in a death-grip. The dog had fatally bitten its prey through the throat, but the other had clawed it almost to death.

There is a more terrible evidence than this, however, of the power behind the claws of an angered ant-eater. A native captured a young one alive and was making off with it. The mother rushed to the rescue of her little one. The man would have escaped if the pipe with which he blew his poisoned arrows had not become wedged between the trunks of two trees and detained him. The big animal sprang upon him from the rear and pulled him down. He aimed a back-hand blow with his knife which caused the death of the ant-eater, but she sank her claws with such frightful force in his chest that he died.

THE PEACE-LOVING CREATURE WITH A COAT OF MAIL

Tremendous claws, but no fighting instinct, appear in the group to which we now pass, the Armadillos. They have teeth, but not in front, though some of them have in infancy the useless milk teeth of which mention has been made. They are long-tongued, too, as insect-catchers should be, but not like the ant-eaters. The strangest features of these creatures is their coat of mail, unique among modern mammals. They have bony plate armor, not beneath the skin, as in the case of the old giant sloths, but conspicuous on the outside.

This armament varies with different species, and each species has its own pattern for every little plate it carries. All are magnificent burrowers. They sink a shaft and themselves with it as one approaches, and it takes a good man to haul even a little one back if it is halfway down its new retreat.

The smallest of the several species are the Pichiciagos, or Pigmy Armadillos—neat little animals, but very shy. They have a pink body armor with trim white hair, where hair can find a place. The whole body is armored, including the tail, which is so stiffened that it cannot be raised, but trails behind the animal as it moves.

HOW THE ARMADILLO CAN GRIND THE LIFE OUT OF A SNAKE

There are several species of these animals. The Six-banded Armadillos are zealous burrowers and voracious devourers of insects. They can eke out their diet with additions of vegetable matter, and are also useful from their habit of devouring carrion.

One, the Peludo, is a good mouser, and in a clumsy but effective manner grapples a snake to its armored hide and grinds the life out of it. It then eats the reptile, none the worse for the poison with which its meal is charged.

The king of the tribe is the Great Armadillo. It is a formidable creature in appearance, a yard in length from nose to tail, and embattled in bony mail from one end to another. It is protected, even on the legs, as thoroughly as a scaly crocodile. The claws of this species are long and strong.

We pass to the Three-banded Armadillos to find the same plan of armor. As a further protection these animals can curl up like a hedgehog and present an impenetrable ball to an enemy. The method is really more wonderful than that of the hedgehog or the porcupine, for these armadillos have a difficult mail into which to fit. They do fit, for the head and the tail pass perfectly through openings in the upper surface of the armor. The openings there are bony doors through which there is no way.

THE LIVING FORTRESSES WHICH CAME BEFORE THE ARMADILLO

These animals are active, running with a hasty tiptoe trot, reminding one of the action of tiny, tired and aged ponies. They have a varied diet. They hunt by night where men are, by day where men are not, but they are not holding their own.

The present armadillos are not the largest that have ever existed. The soil of South America is full of the bones of larger animals of their kind. One family, called the Glyptodons, has left many skeletons in the pampas around Buenos Aires. Some were as much as sixteen feet long, including the tail. Some moved northward and reached Texas and the Gulf states.

The back of the typical Glyptodon was covered with a solid piece of bony mail. The tail was composed of a series of bony rings. The backbone was solid except at the neck. Here a complicated joint allowed the head to be drawn back under the bony plate. In some members of the family the tail was solid bone.

In life they must have looked like freakish giant tortoises, but they were warm-blooded mammals, the last word in defensive methods as opposed to speed and enterprise. They attained this great size, they moved like living fortresses over the earth; then Nature, who had lavished such care upon their fashioning, seemed to tire of them. They were not worth troubling with further. She let them die. Life was sluggish in that vast city of bone, effort was wasted in the production of a tail five feet long, big as a barrel in circumference, spiked incredibly, and so heavy that the mere last joint of it, when found on the plains today, is as much as a strong man can lift.

THE BIG ANT-EATER WHICH CURLS ITSELF UP INTO A BALL

The race was not to be to these unwieldy tanks; what else remained in the Order? There were the Pangolins and

FEW TEETH AND SMALL BRAINS

The Pichiciago, or Pigmy Armadillo.

The Ant-bear, or Aard-vark.

Great Ant-eaters in their native haunts.

The Peludo, or Hairy Armadillo.

The Tamandua or Lesser Ant-eater.

the Ant-bears, or Aard-varks, both of which, unlike the others, belong to the Old World.

The Pangolins are found in the warmer parts of Asia and in Africa. There are seven recognized species, three belonging to Africa. They vary in size from one to three feet without the tail. In some species this is short, but in others is twice as long as the body. The legs are so short that the animal seems to be planted on the ground. Most astonishing is the covering. All the animal except the under-part is covered with horny scales. In some species the whole tail is covered. The animal has been compared to a fir-cone set on pegs. This is the only mammal that now has anything resembling scales, though many extinct animals were once so covered, as the remains in the rocks show.

Their claws are sharp and strong, but in order that they may not become blunt the animal walks on the knuckles and the sides of the feet. Their gait is, of course, slow and awkward. There are no teeth of any sort, and the tongue is long, worm-like and sticky. Most species can climb trees in search of food, but all burrow in the ground.

Appalling creatures they seemed to the Europeans who first met them, for they range up to six feet in length; but they are harmless, and live entirely on termites and ants. Their idea of life is defense, not defiance, for they curl themselves up like gigantic wood-lice. Then, as a matter of fact, defiance might be added, for such is their strength that it is practically impossible to unroll them.

THE HIDEOUS CREATURE WHICH IS AFRAID TO MOVE BY DAY

As to the ant-bears, they are perhaps better known by the old Boer name of Aard-vark, or "earth-pig." But pigs they never were, though the long slim pig-shaped snout shows why the name was given. Though less worm-like than that of the pangolins and ant-eaters, the tongue of the ant-bear is a whip-like ribbon of stickiness. It works wholesale destruction among the ants which the huge claws have exposed to light by rapid digging. One of our pictures shows how they break into the huge cone-shaped ant-hills so common in many parts of Africa. The inmates are helpless as the long, sticky tongue searches out every corner of the home that had seemed so secure.

Teeth are present in the jaws, but not in front; the ears are huge, the tail is thick and ungainly at the root, and sometimes twenty inches long. The whole length, tail and all, is often over six feet. The color is sandy or yellow.

Moving only at night, the ant-bear is a hideous animal, harmless and timid. It is capable of sinking its body in the soil with amazing speed, even in hard soil. Breaking into one of the cone-like ant-hills common in the region in which it lives is easy work.

There are several species, of which two are somewhat common. All live in Africa and nowhere else. The natives eat the flesh, but it has a peculiar taste due to the food the animal eats, and white men generally do not care for it. The skin also has some value, and like so many other wild creatures, the animal seems likely to disappear with increase of population.

There was a time when architects delighted to embellish lovely old cathedrals with grim gargoyles. Nature, the greatest of architects, seems to have had her gargoyle-loving phase too. The Order through which we have now hurried includes some of the most fantastic of all her creations. All are ugly and unattractive. Not a brain worth possessing has ever pulsed beneath an Edentate skull. Size, strength, resistance, and force able to pull down a tree have all been present in this strange assemblage. But the stamp of inferiority is on all.

THE INTERESTING ANIMALS THAT ARE PASSING OUT OF EXISTENCE

The most helpless of all our group is the two-toed sloth, and that is the most highly specialized of its kind. The animal is perfect where it is, for the time being. But a storm can kill a colony; a long drought such as South America knows may exterminate a species. True, a sloth can fast unharmed for a month and survive frightful injuries, but it cannot adapt itself to a change of circumstances. It can live only in a narrow range. The Edentates are among the most interesting and fascinating animals in the world, but not in arousing admiration. They are a pathetic warning to mankind that to strive is the only hope for the attainment of an honorable goal. The path of least resistance leads to the downfall of the species as of the individual.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 2501.

WHAT THIS STORY TELLS US

THE life of Philip Nolan is told so simply and so well that many have believed that it is a true story. While no such punishment was ever given to a United States officer, Reverend Edward Everett Hale, the author, has truthfully described the feelings of a man cut off from home and country by his own act. The story was written in the dark days of 1863, when there were many disloyal persons in the North, and it was written as a warning. The tale is told by an old naval officer, recalling events supposed to have happened long before, when he was a young man. Every boy and girl should read the book.

THE MAN WITHOUT A COUNTRY

CONTINUED FROM 1989

PHILIP NOLAN was as fine a young officer as there was in the "Legion of the West," as Dr. Hale called the western division of the United States army. He was stationed for a time at a fort on the Mississippi. One day there arrived at the fort a fascinating stranger of courtly manners and handsome figure. It was Aaron Burr, whose term as vice-president of the United States had just expired. Burr noticed Nolan, talked to him, walked with him, and, in short, fascinated the young officer.

When he went on his way, the joy seemed to have gone out of life for Nolan. The soldier's life now became tame and wearisome. Sometimes he wrote to his idol long, high-worded, stilted letters, written and rewritten and copied. But never a line did he have in reply. The other young officers in the garrison laughed at the time that he spent in this way.

But one day Nolan had his revenge. Burr came down the river again. Rumor said he had an army behind him and an empire before him. What he meant to do, we do not know. But probably he was bent upon conquering Mexico, and setting up a state with himself as chief. It was a great day to poor Nolan. Burr had not been at the fort an hour before he sent for him. He asked Nolan to take him out in his skiff—to show him a canebrake, he said. Really it was to enlist him in his cause. And he succeeded. Deceived by his charm and led away by his false promises, Nolan swore that when the time came he would obey any orders and march anywhere. What Burr meant to do can never be known. President Jefferson was informed of his schemes and had him arrested. A long and exciting trial for treason followed at Richmond. Among the officers who were to be tried by court-martial was little Nolan.

The trials dragged on. The officers of higher rank escaped, but Nolan was found guilty, and he was guilty. At the close of his trial the president of the court asked him whether he wished to say anything to show he had been faithful to the United States. Nolan, sick at heart and bewildered at the downfall of his hero, cried out in a fit of frenzy, "Damn the United States! I wish I may never hear of the United States again!"

He did not know how the words shocked old Colonel Morgan, who was presiding. Half the officers who sat in it had served through the Revolution. Their lives had been risked for the very thing which in his madness he cursed so recklessly.

From that moment, September 23, 1807, till the day he died, May 11, 1863, he never heard that sacred name again. For that half-century, and more, he was a man without a country. Old Colonel Morgan called the court

into his private room, and returned in fifteen minutes, with a face like a sheet, to say:

"Prisoner, hear the sentence of the court! The court decides, subject to the approval of the President, that you never hear the name of the United States again."

Nolan laughed. No one else laughed, for the Colonel was too solemn, and the whole room was hushed to a death-like stillness. Even Nolan lost his swagger in a moment. Colonel Morgan added:

"Mr. Marshal, take the prisoner to Orleans in an armed boat, and deliver him to the naval commander there.

"Mr. Marshal," continued the Colonel, "see that no one mentions the United States to the prisoner. Make my respects to Lieutenant Mitchell at Orleans, and request him to order that no one shall mention the United States to the prisoner while he is on board ship. You will receive your written orders from the officer on duty here this evening. The court is adjourned without a day."

Nolan was taken on the Nautilus from New Orleans to the North Atlantic coast, but not allowed to land. Then the Secretary of the Navy put him on board a government vessel bound on a long cruise, giving instructions to the commander of the ship. Nolan was to be confined only so closely that he could not escape; and to be provided with such quarters, rations and clothing as would be proper for an officer of his late rank. No insults were to be offered him, nor was he ever to be reminded unnecessarily that he was a prisoner. But under no circumstances was he ever to hear of his country.

The author, through the naval officer who is supposed to be telling the tale, describes Nolan's life in these words:

HOW PHILIP NOLAN SPENT HIS DAYS

THE rule adopted on board the ships on which I have met "The Man Without a Country" was, I think, transmitted from the beginning. No mess liked to have him permanently, because his presence cut off all talk of home or of the prospect of return, of politics or letters, of peace or of war,—cut off more than half the talk men like to have at sea. But it was always thought too hard that he should never meet the rest of us, except to touch hats, and we finally sank into one system. He was not permitted to talk with the men unless an officer was by. With officers he had unrestrained intercourse, as far as they and he chose. But he grew shy, though he had favorites: I was one. Then the captain always asked him to dinner on Monday. Every mess in succession took up the invitation in its turn. According to the size of the ship, you had him at your mess more or less often at dinner. His breakfast he ate in his own stateroom,—he always had a stateroom,—which was where a sentinel, or somebody on the watch, could see the door. And whatever else he ate or drank he ate or drank alone. Sometimes, when the marines or sailors had any special jollification, they were permitted to invite "Plain-Buttons," as they called him. Then Nolan was sent with some officer, and the men were forbidden to speak of home while he was there. I believe the theory was, that the sight of his punishment did them good. They called him "Plain-Buttons," because, while he always chose to wear a regulation army-uniform, he was not permitted to wear the army-button, for the reason that it bore either the initials or the insignia of the country he had disowned.

I remember, soon after I joined the navy, I was on shore with some of the older officers from our ship and from the Brandywine, which we had met at Alexandria. We had leave to make a party and go up to Cairo and the Pyramids. As we jogged along (you went on donkeys then) some of the gentlemen (we boys called them "Dons," but the phrase was long since changed) fell to talking about Nolan, and some one told the system which was adopted from the first about his books and other reading. As he was almost never permitted to go on shore, even though the vessel lay in port for months, his time, at the best, hung heavy; and everybody was permitted to lend him books, if they were not published in America and made no allusion to it. These were common enough in the old days, when people in the other hemisphere talked of the United States as little as we do of Paraguay. He had almost all the foreign papers that came into the ship, sooner or later; only somebody must go

over them first, and cut out any advertisement or stray paragraph that alluded to America. This was a little cruel sometimes, when the back of what was cut out might be as innocent as Hesiod. Right in the midst of one of Napoleon's battles, or one of Canning's speeches, poor Nolan would find a great hole, because on the back of the page of that paper there had been an advertisement of a packet for New York, or a scrap from the President's message. I say this was the first time I ever heard of this plan, which afterwards I had enough, and more than enough, to do with. I remember it, because poor Phillips, who was of the party, as soon as the allusion to reading was made, told a story of something which happened at the Cape of Good Hope on Nolan's first voyage; and it is the only thing I ever knew of that voyage. They had touched at the Cape, and had done the civil thing with the English Admiral and the fleet, and then, leaving for a long cruise up the Indian Ocean, Phillips had borrowed a lot of English books from an officer, which, in those days, as indeed in these, was quite a windfall. Among them, as the Devil would order, was The Lay of the Last Minstrel, which they had all of them heard of, but which most of them had never seen. I think it could not have been published long. Well, nobody thought there could be any risk of anything national in that, though Phillips swore old Shaw had cut out The Tempest from Shakespeare before he let Nolan have it, because he said "the Bermudas ought to be ours and, by Jove, should be one day." So Nolan was permitted to join the circle one afternoon when a lot of them sat on deck smoking and reading aloud. People do not do such things so often now, but when I was young we got rid of a great deal of time so. Well, so it happened that in his turn Nolan took the book and read to the others; and he read very well, as I know. Nobody in the circle knew a line of the poem, only it was all magic and Border chivalry, and was ten thousand years ago. Poor Nolan read steadily through the fifth canto, stopped a minute and drank something, and then began, without a thought of what was coming,—

Breathes there the man, with soul so dead,
Who never to himself hath said—

It seems impossible to us that anybody ever heard this for the first time; but all these fellows did then, and poor Nolan himself went on, still unconsciously or mechanically,—

This is my own, my native land!

Then they all saw something was to pay; but he expected to get through, I suppose, turned a little pale, but plunged on,—

Whose heart hath ne'er within him burned,
As home his footsteps he hath turned
From wandering on a foreign strand?—
If such there breathe, go, mark him well.

By this time the men were all beside themselves, wishing there was any way to make him turn over two pages; but he had not quite presence of mind for that; he gagged a little, colored crimson, and staggered on,

For him no minstrel raptures swell;
High though his titles, proud his name,
Boundless his wealth as wish can claim;
Despite these titles, power, and pelf,
The wretch, concentred all in self,—

and here the poor fellow choked, could not go on, but started up, swung the book into the sea, vanished into his stateroom, "and by Jove," said Phillips, "we did not see him for two months again. And I had to make up some beggarly story to that English surgeon why I did not return his Walter Scott to him."

That story shows about the time when Nolan's braggadocio must have broken down. At first, they said, he took a very high tone, considered his imprisonment a mere farce, affected to enjoy the voyage, and all that; but Phillips said that after he came out of his stateroom he never was the same man again. He never read aloud again, unless it was the Bible or Shakespeare, or something else he was sure of. But it was not that merely. He never entered in with the other young men exactly as a companion again. He was always shy afterwards, when I knew him, —very seldom spoke, unless he was spoken to, except to a very few friends. He lighted up occasionally,—I remember late in his life hearing him fairly eloquent on something which had been suggested to him by one of Fléchier's sermons,—but generally he had the nervous, tired look of a heart-wounded man.

When Captain Shaw was coming home, —if, as I say, it was Shaw,—rather to the surprise of everybody they made one of the Windward Islands, and lay off and on

for nearly a week. The boys said the officers were sick of salt-junk and meant to have turtle-soup before they came home. But after several days the Warren came to the same rendezvous; they exchanged signals; she sent to Phillips and these homeward-bound men letters and papers, and told them she was outward bound, perhaps to the Mediterranean, and took poor Nolan and his traps on the boat back to try his second cruise. He looked very blank when he was told to get ready to join her. He had known enough of the signs of the sky to know that till that moment he was going "home." But this was a distinct evidence of something he had not thought of, perhaps,—that there was no going home for him, even to a prison. And this was the first of some twenty such transfers, which brought him sooner or later into half our best vessels, but which kept him all his life at least some hundred miles from the country he had hoped he might never hear of again.

It may have been on that second cruise —it was once when he was up the Mediterranean—that Mrs. Graff, the celebrated Southern beauty of those days, danced with him. They had been lying a long time in the Bay of Naples, and the officers were very intimate in the English fleet, and there had been great festivities, and our men thought they must give a great ball on board the ship. How they ever did it on board the Warren I am sure I do not know. Perhaps it was not the Warren, or perhaps ladies did not take up so much room as they do now. They wanted to use Nolan's stateroom for something, and they hated to do it without asking him to the ball; so the captain said they might ask him, if they would be responsible that he did not talk with the wrong people, "who would give him intelligence." So the dance went on, the finest party that had ever been known, I dare say; for I never heard of a man-of-war ball that was not. For ladies they had the family of the American consul, one or two travelers who had adventured so far, and a nice bevy of English girls and matrons, perhaps Lady Hamilton herself.

Well, different officers relieved each other in standing and talking with Nolan in a friendly way, so as to be sure that nobody else spoke to him. The dancing went on with spirit, and after a while even the fellows who took this honorary guard of Nolan ceased to fear any *contretemps*. Only when some English lady—Lady Hamilton, as I said, perhaps—called for a set of "American dances," an odd thing happened. Everybody then danced contra-dances. The black band, nothing loath, conferred as to what "American dances" were, and started off with "Virginia Reel," which they followed with "Money-Musk," which, in its turn in those days, should have been followed by "The Old Thirteen." But just as Dick, the leader, tapped for his fiddles to begin, and bent forward, about to say, in true negro state, "The Old Thirteen, gentlemen and ladies!" as he had said, "Virginny Reel, if you please!" and "Money-Musk, if you please!" the captain's boy tapped him on the shoulder, whispered to him, and he did not announce the name of the dance; he merely bowed, began on the air, and they all fell to,—the officers teaching the English girls the figure, but not telling them why it had no name.

But that is not the story I started to tell.—As the dancing went on, Nolan and our fellows all got at ease, as I said, —so much so, that it seemed quite natural for him to bow to that splendid Mrs. Graff, and say,—

"I hope you have not forgotten me, Miss Rutledge. Shall I have the honor of dancing?"

He did it so quickly, that Shubrick, who was by him, could not hinder him. She laughed and said,—

"I am not Miss Rutledge any longer, Mr. Nolan; but I will dance all the same," just nodded to Shubrick, as if to say he must leave Mr. Nolan to her, and led him off to the place where the dance was forming.

Nolan thought he had got his chance. He had known her at Philadelphia, and at other places had met her, and this was a godsend. You could not talk in contra-dances, as you do in cotillons, or even in the pauses of waltzing; but there were chances for tongues and sounds, as well as for eyes and blushes. He began with her travels, and Europe, and Vesuvius, and the French; and then, when they had worked down, and had that long talking-time at the bottom of the set, he said boldly,—a little pale, she said, as she told me the story, years after,—

"And what do you hear from home, Mrs. Graff?"

And that splendid creature looked through him. Jove! how she must have looked through him! "Home!! Mr. Nolan!!! I thought you were the man who never wanted to hear of home again!"—and she walked directly up the deck to her husband, and left poor Nolan alone, as he always was. He did not dance again.

I cannot give any history of him in order: nobody can now: and, indeed, I am not trying to. These are the traditions, which I sort out, as I believe them, from the myths which have been told about this man for forty years. The lies that have been told about him are legion. The fellows used to say he was the "Iron Mask"; and poor George Pons went to his grave in the belief that this was the author of Junius who was being punished for his celebrated libel on Thomas Jefferson. Pons was not very strong in the historical line. A happier story than either of these I have told is of the War. That came along soon after. I have heard this affair told in three or four ways,—and, indeed, it may have happened more than once. But which ship it was on I cannot tell. However, in one, at least, of the great frigate-duels with the English, in which the navy was really baptized, it happened that a round shot from the enemy entered one of our ports square, and took right down the officer of the gun himself, and almost every man of the gun's crew. Now you may say what you choose about courage, but that is not a nice thing to see. But, as the men who were not killed picked themselves up, and as they and the surgeon's people were carrying off the bodies, there appeared Nolan, in his shirt-sleeves, with the rammer in his hand, and, just as if he had been the officer, told them off with authority,—who should go to the cockpit with the wounded men, who should stay with him, —perfectly cheery, and with that way which makes men feel sure all is right and is going to be right. And he finished loading the gun with his own hands, aimed it, and bade the men fire. And there he stayed, captain of that gun, keeping those fellows in spirits, till the enemy struck,—sitting on the carriage while the gun was cooling, though he was exposed all the time—showing them easier ways to handle heavy shot,—making the raw hands laugh at their own blunders,—and when the gun cooled again, getting it loaded and fired twice as often as any other gun on the ship. The captain walked forward, by way of encouraging the men, and Nolan touched his hat and said,—

"I am showing them how we do this in the artillery, sir."

And this is a part of the story where all the legends agree: that the Commodore said,—

"I see you do, and I thank you, sir; and I shall never forget this day, sir, and you never shall, sir."

And after the whole thing was over, and he had the Englishman's sword, in the midst of the state and ceremony of the quarter-deck, he said,—

"Where is Mr. Nolan? Ask Mr. Nolan to come here."

And when Nolan came, the captain said,—

"Mr. Nolan, we are all very grateful to you to-day; you are one of us to-day; you will be named in the despatches."

And then the old man took off his own sword of ceremony, and gave it to Nolan, and made him put it on. The man told me this who saw it. Nolan cried like a baby, and well he might. He had not worn a sword since that infernal day at Fort Adams. But always afterwards, on occasions of ceremony, he wore that quaint old French sword of the Commodore's.

The captain did mention him in the despatches. It was always said he asked that he might be pardoned. He wrote a special letter to the Secretary of War. But nothing ever came of it. As I said, that was about the time when they began to ignore the whole transaction at Washington, and when Nolan's imprisonment began to carry itself on because there was nobody to stop it without any new orders from home.

I have heard it said that he was with Porter when he took possession of the Nukahiwa Islands. Not this Porter, you know, but old Porter, his father, Essex Porter,—that is the old Essex Porter, not this Essex. As an artillery officer, who had seen service in the West, Nolan knew more about fortifications, embrasures, ravelins, stockades, and all that, than any of them did; and he worked with a right good will in fixing that battery all right. I have always thought it was a pity Porter did not leave him in

command there with Gamble. That would have settled all the question about his punishment. We should have kept the islands, and at this moment we should have one station in the Pacific Ocean. Our French friends, too, when they wanted this little watering-place, would have found it was preoccupied. But Madison and the Virginians, of course, flung all that away.

All that was near fifty years ago. If Nolan was thirty then, he must have been near eighty when he died. He looked sixty when he was forty. But he never seemed to me to change a hair afterwards. As I imagine his life, from what I have seen and heard of it, he must have been in every sea, and yet almost never on land. He must have known, in a formal way, more officers in our service than any man living knows. He told me once, with a grave smile, that no man in the world lived so methodical a life as he. "You know the boys say I am the Iron Mask, and you know how busy he was." He said it did not do for any one to try to read all the time, more than to do anything else all the time; but that he read just five hours a day. "Then," he said, "I keep up my note-books, writing in them at such and such hours from what I have been reading; and I include in these my scrap-books." These were very curious indeed. He had six or eight, of different subjects. There was one of history, one of natural science, one which he called "Odds and Ends." But they were not merely books of extracts from newspapers. They had bits of plants and ribbons, shells tied on, and carved scraps of bone and wood, which he had taught the men to cut for him, and they were beautifully illustrated. He drew admirably. He had some of the funniest drawings there, and some of the most pathetic, that I have ever seen in my life. I wonder who will have Nolan's scrap-books.

Well, he said his reading and his notes were his profession, and that they took five hours and two hours respectively of each day. "Then," said he, "every man should have a diversion as well as a profession. My natural history is my diversion." That took two hours a day more. The men used to bring him birds and fish, but on a long cruise he had to satisfy himself with centipedes and cockroaches and such small game. He was the only naturalist I ever met who knew anything about the habits of the housefly and the mosquito. All those people can tell you whether they are *Lepidoptera* or *Steptopotera;* but as for telling how you can get rid of them, or how they get away from you when you strike them, —why Linnæus knew as little of that as John Foy, the idiot, did. These nine hours made Nolan's regular daily "occupation." The rest of the time he talked or walked. Till he grew very old, he went aloft a great deal. He always kept up his exercise, and I never heard that he was ill. If any other man was ill, he was the kindest nurse in the world; and he knew more than half the surgeons do. Then if anybody was sick or died, or if the captain wanted him to on any other occasion, he was always ready to read prayers. I have remarked that he read beautifully.

My own acquaintance with Philip Nolan began six or eight years after the war, on my first voyage after I was appointed a midshipman. It was in the first days after our slave-trade treaty, while the Reigning House, which was still the house of Virginia, had still a sort of sentimentalism about the suppression of the horrors of the Middle Passage, and something was sometimes done that way. We were in the South Atlantic on that business. From the time I joined, I believe I thought Nolan was a sort of lay chaplain, —a chaplain with a blue coat. I never asked about him. Everything in the ship was strange to me. I knew it was green to ask questions, and I suppose I thought there was a "Plain-Buttons" on every ship. We had him to dine in our mess once a week, and the caution was given that on that day nothing was to be said about home. But if they had told us not to say anything about the planet Mars or the Book of Deuteronomy, I should not have asked why; there were a great many things which seemed to me to have as little reason. I first came to understand anything about "the man without a country" one day when we overhauled a dirty little schooner which had slaves on board. An officer was sent to take charge of her, and after a few minutes he sent back his boat to ask that some one might be sent him who could speak Portuguese. We were all looking over the rail when the message came, and we all wished we could interpret, when the captain asked who

spoke Portuguese. But none of the officers did; and just as the captain was sending forward to ask if any of the people could, Nolan stepped out and said he should be glad to interpret, if the captain wished, as he understood the language. The captain thanked him, fitted out another boat with him, and in this boat it was my luck to go.

There were not a great many of the negroes; but by way of making what there were understand that they were free, Vaughan had had their handcuffs and anklecuffs knocked off, and, for convenience' sake, was putting them upon the rascals of the schooner's crew. The negroes were, most of them, out of the hold, and swarming all round the dirty deck, with a central throng surrounding Vaughan and addressing him in every dialect and *patois* of a dialect, from the Zulu click up to the Parisian of Beledelkereed.

As we came on deck, Vaughan looked down from a hogshead, on which he had mounted in desperation, and said,—

"For God's love, is there anybody who can make these wretches understand something? The men gave them rum, and that did not quiet them. I knocked that big fellow down twice, and that did not soothe him. And then I talked Choctaw to all of them together; and I'll be hanged if they understood that as well as they understood the English."

Nolan said he could speak Portuguese, and one or two fine-looking Kroomen were dragged out, who, as it had been found already, had worked for the Portuguese on the coast at Fernando Po.

. . . . . .

Such was the lieutenant's own story of his first knowledge of Nolan. But we shall continue in a shorter form.

"Tell them they are free," said the officer in charge, "and tell them that these rascals are to be hanged as soon as we can get rope enough."

Nolan explained, and the negroes went nearly wild with delight, kissing his feet and worshiping the other officer as the god of the occasion.

"Tell them," said Vaughan, well pleased, "that I will take them all to Cape Palmas."

This did not answer so well, and they all clamored eagerly for something else. Vaughan was rather disappointed and asked Nolan eagerly what they said. The drops stood on poor Nolan's white forehead, as he hushed the men down and said:

"He says, 'Not Palmas.' He says 'Take us home; take us to our own country; take us to our own house; take us to our own children and our own women.' He says he has an old father and mother who will die if they do not see him."

Vaughan himself grew gray as Nolan struggled through this speech. Even the negroes stopped howling as they saw Nolan's agony and Vaughan's almost equal agony of pity. As quick as he could get words the commander said:

"Tell them yes, yes, yes; tell them they shall go to the Mountains of the Moon, if they will. If I sail the schooner through the Great White Desert, they shall go home!"

After some fashion Nolan said this to the men, and then, for he could not stand any more, went back to the ship. As he lay back in the boat he said to a young midshipman who accompanied him: "Youngster, let that show you what it is to be without a family, without a home, and without a country, and if ever you are tempted to say a word or do a thing that shall put a bar between you and your family, your home and your country, pray God in His mercy to take you that instant home to His Heaven. As for your country, boy"—and the words rattled in his throat—"and for that flag"—and he pointed to the ship —"never dream a dream but of serving her as she bids you, though the service carry you through a thousand hells. No matter what happens to you, no matter who flatters you or who abuses you, never look at another flag, never let a night pass but you pray God to bless that flag."

At last Nolan fell ill, and allowed the doctor to come and see him as he lay there—the first time that the doctor had been in the stateroom—and then sent for one of the officers who was his friend. Danforth quickly obeyed the summons and found the old man in his berth, smiling pleasantly but looking very frail. He had made a little shrine of the cabin he was lying in. The Stars and Stripes were triced up above and around a picture of Washington, and he had painted a majestic eagle, with lightning blazing from his beak, and his foot just clasping the whole globe which his wings overshadowed. Seeing the young man's

glance, Nolan said with a sad smile: "Here, you see, I have a country!" And he pointed to the foot of his bed, where was a great map of the United States as he had drawn it from memory, and which he had to look upon as he lay. Quaint, queer old names were on it in large letters —"Indian country," "Mississippi Territory," and on the Pacific shore nothing.

"Oh, Danforth," he said, "I know I am dying. I cannot get home. Surely you will tell me something now? Stop! Stop! Do not speak till I say what I am sure you know, that there is not in this ship, that there is not in America—God bless her!—a more loyal man than I. There cannot be a man who loves the old flag as I do, or prays for it as I do, or hopes for it as I do. There are thirty-four stars in it now, Danforth. I thank God for that, though I do not know what their names are. There has never been one taken away; I thank God for that. But tell me, tell me something—tell me everything, Danforth, before I die!"

And Danforth said, "Mr. Nolan, I will tell you everything you ask about. Only, where shall I begin?"

A blessed smile crept over his white face, and he pressed the officer's hand and said: "God bless you. Tell me their names," and pointed to the stars on the flag. "The last I know is Ohio. My father lived in Kentucky. But I have guessed Michigan and Indiana, and Mississippi—that was where Fort Adams was—they make twenty. But where are your other fourteen? You have not cut up any of the old ones, I hope."

So Danforth told him the names, and drew them in on the beautiful map, and in one hour tried to tell the sick man the history of half a century. He spoke of travel and the means of it; of steamboats and railroads and telegraphs; of inventions and books and literature; of the colleges and West Point and the Naval Academy; who was President and how Washington had grown. Everything that he could think of that would show the grandeur of his country and its prosperity he told him, but he had not the heart to tell him of the Civil War.

Nolan asked about all his old companions in arms and the naval officers he had known. He asked about Burr with some emotion, for his admiration had changed into passionate dislike, but said in a moment: "God forgive me, for I am sure I forgive him." He inquired about the commander of the Western army in which he had served so long before, and wished to know if President Lincoln was the son of General Benjamin Lincoln of the Revolution. When told that the President had come up from the ranks he was pleased, for he had been afraid that the office would be confined to a few families, as it had been in the early days. His curiosity could not be satisfied.

Danforth told him more. He spoke of the new Capital, of how California and Oregon came into the Union. Nolan had suspected that there were states on the Pacific coast, for he had not been allowed to go ashore there.

And Nolan drank it in and enjoyed it as he had enjoyed nothing for fifty years. He grew more and more silent, and Danforth gave him a glass of water, but he just wet his lips, and told him not to go away. Then he asked for the Book of Public Prayer, which lay beyond him, saying with a smile that it would open at the right place, and so it did. There was his double red mark down the page by the Thanksgiving prayer for the country. And he turned to the end of the same book and showed his friend the prayer for the President and the country. "Danforth," he said, "I have repeated those prayers night and morning, it is now fifty-five years." And then he said he would go to sleep. Danforth realized that Nolan was again a happy man.

In an hour, when the doctor went in, he found Nolan had breathed his life away with a smile. They looked in his Bible, and there was a slip of paper at the place where he had marked the text: "They desire a country, even a heavenly, wherefore God is not ashamed to be called their God, for He hath prepared for them a city." On the paper he had written:

"Bury me in the sea: it has been my home, and I love it. But will not some one set up a stone for my memory at Fort Adams or at Orleans? Say on it:

IN MEMORY OF
PHILIP NOLAN
LIEUTENANT IN THE ARMY OF THE
UNITED STATES
HE LOVED HIS COUNTRY AS NO OTHER
MAN HAS LOVED HER; BUT NO MAN
DESERVED LESS AT HER HANDS."

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 2773.

Photo, Canadian National Railways.

Carting hay from the field in Nova Scotia.

THE FORAGE PLANTS

CONTINUED FROM 2280

THAT a people should be able to produce enough food to feed itself is one of the first conditions of its comfort and happiness. We have seen how man has grappled with the food problem and by improved cultivation and skillful selection of the best plants has produced bigger and finer crops.

But it is not enough, especially in northern lands, to grow foods only for man. To assure adequate supplies of milk and meat all the year round it is necessary that stocks of animals should be kept through the winter, and this can be done only if food is stored for the animals. It is essential for the farmer to grow crops for his cattle, horses and sheep.

Perhaps there is no sphere in which the amazing progress of man is more strikingly seen than in his breakfast and dinner table. In these days the humblest family has an astonishing variety and abundance of good foods always available. In the depths of winter a family can sit down to a meal in which fresh milk, fruit and eggs, with equally fresh beef, mutton or pork, play a large part. In the old days, as we have seen, there was no such variety or abundance.

Owing to the absence of root crops and of adequate supplies of nourishing hay such as the clovers provide for feeding cattle and sheep in winter, large numbers of animals had to be killed off during autumn, and their flesh salted in readiness for winter food for men, women and children. In Europe a certain number of animals were kept alive through the winter for the benefit of the feudal lords and their friends, but the mass of the people had a miserable time, existing on a pittance of poor bread and a little salted meat, with no milk and no eggs. No wonder plagues were rife. Now meat, milk, eggs, cheese and butter are common for all; and the wonderful change has been brought about by the scientific methods of agriculturists who are able to grow all kinds of crops as forage for animals in winter, so that they need not be killed off in late autumn, before the cold weather sets in.

We have already seen how important the Grass Family is to man. His principal plant foods—wheat, oats, barley, rye, maize, rice and millet—are members of that family; and it is equally true that the grasses are supremely important to animals, for their most regular and important foods are provided by the Grass Family. The chief domestic animals—the horse, ox and sheep—are grass-eaters, and it is no merely poetical expression to say, in regard to our abundant meat supplies, that all flesh is grass.

Our meadows and pastures, though

they look so natural, are as much the product of man's care and industry as the wheatfields and the oatfields, for in these pastures the farmer grows only such grasses as long experience has taught him are most useful and nourishing when used as fodder, or cattle food.

THE GRASS THAT LOOKS LIKE A CARPET ON THE MEADOW

One of the most valuable of the grasses grown for fodder is rye-grass, easily identified by its flattened ear, which looks as if it had been under a roller. This develops vigorous leafy shoots, and the plant, covering a meadow, forms a thick close carpet. Being trampled under foot does not seem to hurt it, but rather helps it to grow more strongly.

A very graceful fodder grass is the yellow oat-grass, which has slender flat leaves of pale green covered with short hairs. The fescues are an important group of grasses, some of them broad-leaved and others with narrow leaves. There are different kinds of these, suited to all varieties of soil and climate. Dog's-tail, or crab-grass, is a useful grass for a pasture, but is not of much use in the hayfield, where the grass is required for cutting and drying.

Several of the grasses that are grown for hay need to be cut before flowering, or the stems become too hard and woody to appeal to animals. Timothy-grass is a native British grass, though it was cultivated there only after a certain Timothy Hanson, who had seen it cultivated in America, introduced it as a farm crop. From him the grass received its name, and most of the timothy seed planted in England comes from America, although in the past some has been obtained from Austria and Germany.

THE GRASSES THAT CONQUER IN THE FIGHT FOR LIFE

There are two families of plants, the members of which are often mistaken for grasses—the rushes and the sedges. These, however, are of little food value for animals. Various plants that go by the name of grasses are not really grasses at all. Knot-grass, for instance, a very troublesome weed on arable land, is a relative of the docks and sorrels; rib-grass is a plantain; scorpion-grass a forget-me-not; and scurvy-grass and whitlow-grass are members of the Cabbage Family.

Most grasses are perennials, coming up year after year from the same root, but a few are annuals. Their flowers are borne on spikes, like the wheat and oat. Grasses are very persistent, and conquer most other plants in the fight for life. The Swiss botanist Coaz watched a piece of land which had been quite bare. First the yellow saxifrage appeared, and next season coltsfoot, willow-herb, oxyria and two grasses. In the third season another grass was found, and by the fourth season two fescue-grasses and yarrow were added. Finally, in the fifth season, there were growing on the land five grasses with clovers and yarrow, forming a thick carpet.

A CURIOUS THING ABOUT THE RISE AND FALL OF WATER

The quantity of water in the soil has a marked effect on the kind of grasses that grow in a meadow or pasture. The Danish botanist Geest, who has studied the subject, says that if the water-level in wells is from about six to about nine feet below the surface of the ground meadow poa-grass flourishes, but if the weather is very wet and the water rises in the wells till its level is only three or four feet down, the poa-grass grows so vigorously that it kills the other kind. If there are very heavy floods, and the water rises to within fourteen or fifteen inches of the surface, then the tufted aira grows well, killing the other kinds. But if the water rises higher still this is supplanted by marsh plants.

The wonderful adaptability of grasses to their conditions of life is shown by the proportions of the stem. The base of a factory chimney has to be about a seventeenth of its height, but the grass plant is much more slender, yet braves every storm. The rye has a base only one five-hundredth of its height.

Among valuable forage plants are found many of the Leguminous Family—the family of peas, beans, lentil and similar plants. Chief among these are the clovers, with their leaves made up of three leaflets, like the shamrock. It is noticeable in a clover-field at sunset that the leaves close up and offer the smallest possible surface to the cooling effects of radiation at night.

Clovers are grown both for green forage and for hay, and there are various kinds. The principal kinds cultivated came originally from Europe, but have become naturalized. White clover, sometimes called Dutch clover, spreads in all

RICH FOOD FOR THE CATTLE AND SHEEP

Photo, Ewing Galloway.

Here we see hay being loaded upon a wagon. There are many grasses which provide excellent food for animals, and when dried as hay these lose more than three-quarters of their moisture.

Here is a splendid crop of red clover growing in Manitoba. Clover hay contains about twelve per cent of nitrogenous matter, of which about half is digested by the bullock or sheep eating it.

directions by means of its creeping stems, and this character of the plant prevents it from being cut profitably by the scythe, so that sheep are generally turned into the field to feed on it as it grows.

Red clover, so conspicuous on account of its fine head of purple flowers, is not only used as green food for cattle, but is grown for hay. However, it is particularly liable to disease and is then spoken of as being sick. The complaint may be due to the ravages of the eel worm, a tiny creature almost too small to see with the naked eye, or else to the attacks of a parasitic fungus. A variety of the common red clover known as cow-grass or zigzag clover, is less liable to the clover-sickness. It is quite impossible to distinguish the seed of one from the seed of the other. Another clover very free from liability to disease is alsike clover, which is on this account often used as a substitute for red clover. Crimson, or Italian, clover is the plant farmers call trifolium, although, of course, every clover plant is a trifolium—that is to say, its leaf is divided into three leaflets.

In addition to the true clovers there are several related plants grown for fodder, such as the trefoil, or yellow, clover, sometimes called black medick. Sweet clover, introduced into gardens from Europe, has escaped, and is now often cultivated for hay.

ALFALFA, WHICH SENDS ITS ROOTS DEEP DOWN TO FIND WATER

Another plant closely related to the trefoil is lucerne, a robust plant with bluish purple flowers which develop into curious fruits in the form of spiral pods containing seeds. Being very deep-rooted, it thrives on dry soils, and in places where droughts are common it provides an excellent food for horses.

It is, indeed, one of the most valuable of all fodder plants for warm climates. In the south of England, and in southern Europe generally, it is the great forage plant. In North America, under the name of alfalfa, it is one of the most important plants grown. Many lands supposed to be too dry for farming have been brought into cultivation by means of alfalfa, which, like all the leguminous plants, enriches the soil with nitrogen. Its root is a strong tap root which goes down deep for water, its many branches penetrating and loosening the soil and making it spongy enough to hold moisture when rain falls. In America it is not unusual for a single alfalfa plant to have roots from fifteen to twenty-five feet long burrowing down to find water.

This plant is a splendid enricher of the soil, and forms an excellent preparation for the growing of crops like wheat and corn. Once established, alfalfa will continue growing in the same field for many years, and in the United States from two to seven cuttings of hay can be made every year. The average yield is four or five tons to the acre, but in southern California the yield is as much as ten tons to the acre in irrigated fields, as against only two or three tons of grass, which needs quite as much attention from the farmer.

THE PLANT BROUGHT FROM PERSIA BEFORE JESUS WAS BORN

Carefully dried, the alfalfa leaves make the very best hay, for they are full of protein, the nitrogenous matter which builds up tissue. Cattle are very fond of the plant, and in a field of alfalfa, if not restrained, they will eat far too much and make themselves ill.

The plant was carried from Persia into Greece in 480 B.C. and reached Italy in the first century of the present era. Then it spread slowly over Europe, and was carried by the Spaniards to Mexico in the sixteenth century, soon spreading north and south. Sainfoin, soy beans, and various kinds of vetches are other leguminous plants grown for forage purposes. In North America is grown an enormous hay crop, valued at about two billion dollars a year, and much of it is alfalfa.

THE ROOT CROPS THAT GIVE THE ANIMALS THEIR WINTER FOOD

Among root crops that provide so valuable a source of winter food for animals, the turnip, with its many varieties, holds an important place, as also does the mangel-wurzel, which is really a beet-root. The mangel is a rather uncertain grower, and we may often see in a mangel-field long stretches of the rows bare where the seed has not come up. In gathering the roots the harvests have to be very careful, as a cut causes the root to bleed, and it loses its sap. Rape is a plant closely related to the turnips and rutabagas. It is grown for its foliage only, and it has no enlarged root. Sometimes various forage crops, including corn, are cut up fine while still green and packed tightly into a silo for winter use.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 2531.

STORING UP CATTLE FOOD FOR WINTER

A tower, called a silo, in which green fodder is stored for the winter by compressing it while still green, and keeping it covered from the air. The fodder thus preserved is called ensilage, or silage.

The alfalfa plant, here being stacked in Canada, belongs to the Leguminous Family, which includes the peas and beans and clover. It is increasingly cultivated in Europe, where it is generally called lucerne.

AMERICA'S MOST VALUABLE PLANT

Maize, or Indian corn, or simply corn, is the most valuable crop raised in America. The earliest settlers found the Indians growing small fields of this crop, and white men soon learned to raise it. The grain is good food for man and beast, and the stalks and leaves are relished by cattle and horses. Often the stalks are cut into small pieces before they harden and then put into a silo. When the season is too short to allow the grain to mature, thousands of acres are grown for fodder. It may be put into a silo or else be dried and stored in the barn. When the English use the word corn, they mean wheat, as they do not use much maize.

FORESTS, WOODS AND DESERTS

CONTINUED FROM 2318

HERE is a very interesting and very strange thing. In the earliest history of the world—at least in the earliest history recorded in the rocks—the tiny plants called bacteria and diatoms lived side by side with plants of gigantic size and of far from simple structure. Though in the beginning of life on the earth we find no traces of the little flowers that beautify the world to-day, we find, side by side with the tiny bacteria, big yew trees, and forests containing ferns fifty or a hundred feet high. We might have expected that the first tiny plants would gradually have been transformed into bigger ones, but there are no signs of that. The reason for this strange combination of giants and pigmies, no doubt, is that the pigmies were necessary to the giants and prepared the soil for them.

The very old layers of rocks provide abundant evidence that the early world was covered with jungles and forests, even in its polar regions. Millions of years before there were monkeys there were branches ready for their tails. Millions of years before there were birds there were leafy boughs for their nests. Among the first things the crust of the earth brought forth were forests. For hundreds of thousands of years the world was clad in them as in a green mantle, and in the Carboniferous Age they were particularly abundant. The mare's-tails of that time grew into trees twenty or thirty feet high. The club-mosses soared up to over a hundred feet. There were fern-like plants as high as palms, and plenty of trees. A large part of the earth's surface was covered with forests.

In the forests' dense shadows there reigned almost complete silence. No birds sang, no monkeys chattered, no wild beasts roared. There can have been no sounds save the whispering or the roaring of the wind, the rustling of a dragon-fly's wings, the chirping perhaps of a cricket, or the crash when some giant of the forest fell.

Yet there, century after century, sugar and starch were being made in enormous quantities out of the earth and the air; and wood enough to make a wooden box to cover the planet was being manufactured. The forests seemed useless; all the energy of it seemed wasted. In time the tall trees and ferns died and decayed, and sank in bogs and marshes. But Nature plans a long, long way ahead, and these ancient forests were to become coal, and to serve as rafters and foundations in the great factory of the present day. It is the sunbeams stored in these earliest forests that move our machinery, light our cities, and do most of the world's work.

In many of the coal-fields we find forest after forest on the top of other buried forests, so that sometimes, as in the coal-fields of South Wales and Nova Scotia, the highest forest is 10,000 or 12,000 feet above the lowest, and forty or fifty or more forests may be piled on each other in one coal-field. It has been calculated that the South Wales coal-fields took 640,000 years to build up layer upon layer.

We see, therefore, that in the early life-history of the world forests played a very large—perhaps the largest—part. These mighty fern and horsetail forests disappeared and turned into coal; but ever new forests came up, and by degrees our modern trees came into existence. In them the birds built and sang, and in their shade wandered the remarkable class of animals which suckled their young and so are called mammals. But one tree mammal marked a great epoch even in the age-long history of forests.

A dense forest in Finland.

In the Tertiary Period there appeared in the forest trees the little creature known as a lemur. A harmless little creature it seemed, with nothing very remarkable about it; but it was a climbing creature, climbing up a distinguished family tree. It was the first of the monkey tribe. Of man's first appearance and his habits we know very little; but almost certainly he was once a forest-dweller.

Forests, then, were man's original dwelling places. Ancient forests in the form of coal and oil are to-day the chief sources of his power; and to-day the forests of the world are in many ways of the utmost importance to him. Though now he does not usually live in forests, there are tribes in Africa, South America and New Guinea that still have forest homes.

A great part of the crust of the earth is still covered with forests. In Europe thirty per cent of the soil is so covered, and in Finland more than half the land is forest land. Probably the chief wealth in Austria is now wood. If we do not count deserts, probably more than a quarter of the earth's surface is clad in trees. It is very interesting to think that trees are undoubtedly the oldest living things in the world. There are big sequoia trees in California said to be much more than two thousand years old, and if so, they may have been alive when the tribes of Israel crossed the Red Sea.

In how many ways have forests been useful to mankind! Coal, as we have seen, provides us with motive power on a gigantic scale, timber trees have given building material for ships as well as houses, and in modern days most of the world's supply of paper comes from wood-pulp.

Forests have also other uses. The roots of trees grasp and knit together the soil, and prevent it from being washed away. They shield the ground from the sun and prevent a too-rapid evaporation of moisture. They also provide shelter from weather for man and other animals; and the nuts of various trees are a very healthful form of food. There are other uses, too.

Altogether forests were a very wise and wonderful provision for the needs of mankind.

Vast portions of the earth's surface, however, are covered neither with grass nor with forest. These are the deserts. Of the deserts, the best known is the Sahara, which reaches from the Red Sea in the east to the Atlantic in the west—a distance of about 3,000 miles. From north to south it measures, on the average, 600 miles, and altogether it includes an area equal to about two-thirds of all Europe. We are inclined to think of it as a low-lying, level plain, but it really does not lie low; it is on the average 2,000

DESERT REGIONS OF MOTHER EARTH

The great desert region round the Salton Sea in the state of California.

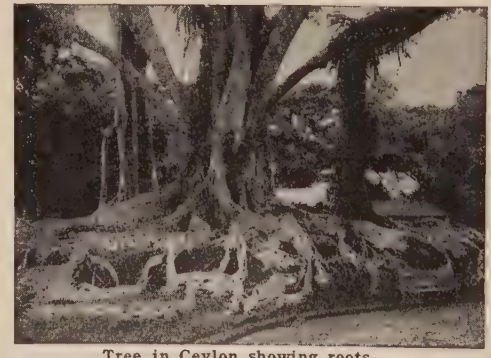
The rippling hills of sand, like ocean waves, in the Sahara Desert.

The long camel caravan crossing the sandy wastes of Palestine.

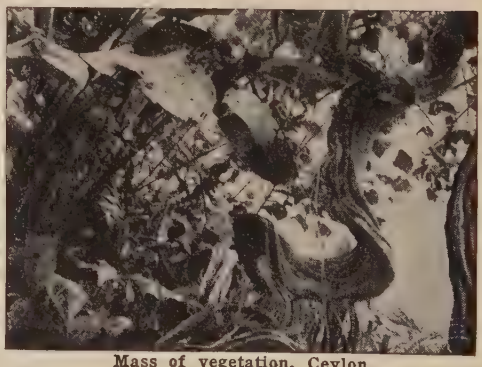
THE WONDERFUL GROWTHS OF TREES

The wonderful banyan tree in Asia out of which a grove is formed.

A characteristic stretch of wooded country in Rhodesia, South Africa.



Tree in Ceylon showing roots.



Mass of vegetation, Ceylon.

THROUGH THE FOREST SILENCES

Jasper Park reservation in Canada.

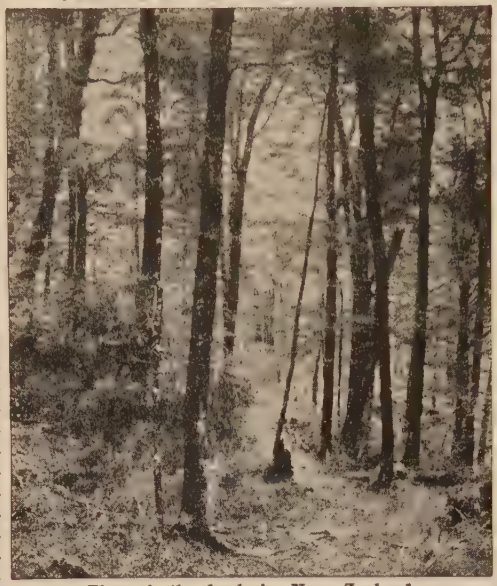
A giant of the forest in Vancouver.

The stately firs on the heath at Leighton Buzzard, Bedfordshire, England.

Growth of giant ferns in Australia.

A shady nook in the Australian Alps.

AMONG THE FORESTS OF THE WORLD



Through the bush in New Zealand.

Jarrah trees in the Darling Ranges.

A forest on the edge of the Waiau River in New Zealand.

Wooded slopes of the Swiss Alps.

Tropical growth in New Zealand.

feet high; and it is not a level plain, for it has many hills and plateaus. In one hilly region some of the peaks exceed 8,000 feet. About the middle of it there is a high range of hills running north and south and dividing it into eastern and western parts. The sand from the western part is blown partly into the Atlantic, and sometimes across even to the Canary Islands, and partly into the Niger and Senegal rivers, and so the desert is being gradually reduced to sea-level.

How the wind and the sand rub away the hills

Here there is no rain; the destructive work is done by the wind; and the rivers act merely as carriers of the sand blown into them. But the sharp sand blown by the desert wind acts as sandpaper, and slowly but surely rubs away the sandstone hills and plateaus. Already parts of the desert in Algeria and Tripoli are below the level of the sea; and it is only a question of time till all the Sahara will be beneath the sea. It might be possible to flood the tracts of sand which are now below sea-level, and if that were done it might greatly alter the climate of the rest of the desert. At present it is quite unfit to live in, owing to the heat and the lack of water. Except for the green oases round springs, even camel caravans could not cross it. The only living creatures in the heart of the desert are scorpions, vipers, lizards and ants.

Yet the soil of the desert is very fertile, and wherever it is watered it blossoms like the rose. In the oases not only date-palms can be grown, but apricots, peaches, pomegranates, oranges, vines, corn, wheat and barley. Some years ago the French sunk 156 artesian wells in the Sahara and obtained enough water to supply 200,000 palms, and it seems a pity that more is not being done in that way.

The great chain of deserts that stretch across Asia

Across the Red Sea from the Sahara stretch the Arabian deserts, and from them a chain of deserts stretches across Asia to China and Siberia, where we come to another great desert almost as large as the Sahara—the Desert of Gobi.

The Gobi Desert is chiefly a dreary waste of rocks and sand, but it is not quite so desolate as the Sahara. In summer it produces enough pasturage to supply a few flocks of sheep and herds of goats with food. It is not hot like the Sahara, but is swept by cold winds from the Arctic regions. It freezes almost every night.

America, like Africa and Asia, has its deserts. Well-known is the great desert of Utah—a desert of clay sometimes sparkling with white sand. There is not a single river or spring in it, and the only living creatures are lizards. Miners had to cross this desert on their way to California after gold was discovered there. It is said that thousands of men, horses and cattle perished from thirst, and that at one time a traveler could find his way by the skeletons lying along the trail. Other great wastes in America are the deserts of Tamarugal and Atacama, both on the western side of the Andes, and both salt deserts. But these two deserts are of great value to the world, for from them millions of tons of saltpetre have been obtained, and Atacama also produces guano. While these deserts are unable to produce crops themselves, still they yield us the means of increasing the fertility of more fortunate lands!

The wise and good purpose that is in everything on earth

A considerable part of Australia and South Africa is also desert, so that these great barren wastes are found in many countries of the world. Except for the saltpetre and guano of the American deserts, these vast spaces of sand seem like strange freaks in the making of the world. But they are certainly very important factors in the natural arrangement for the circulation and distribution of rain and heat. If the Sahara Desert were suddenly turned into forest-land, or wooded hills, or prairie, it would change the whole climate of Europe. Also we must remember that the world is never finished, and that what is desert now may be fertile land in the course of a million years or more.

The world is ever changing according to definite laws, and we are not clever enough to see what all these changes mean. But we can be sure that there is a wise and good purpose in everything, even in fiery volcanoes and earthquakes and deserts. Think of it! A dead forest of the ancient world becomes a source of power for the modern world. Everything is working to some great end that we can understand only in part.

THE NEXT STORY OF THE EARTH IS ON PAGE 2537.

IN THE HEART OF THE WHITE HILLS

East of the Rocky Mountains there is no more rugged scenery in the United States than this northern stretch of New Hampshire's hill country. Above, you see Crawford Notch, viewed from Mount Willard, whose rocky shoulder almost blocks the gateway; below, the picturesque broken cliffs of Dixville Notch.

Baking bread in an electric oven.

THE BREAD BY WHICH WE LIVE

CONTINUED FROM 2326

THERE can be no doubt that after milk the best food is bread, the "staff of life," as it is called. Indeed, if we have milk and bread in pure form we have almost everything the body requires. There is a special reason at the present time to understand the facts of bread, because the history of the part of mankind to which we belong has reached a crisis. What is called Western civilization, to which we belong, is really built up on bread, as contrasted with the Eastern civilizations, which are built up mainly on rice. Wheat is superior to rice as an article of diet, but the white population of the world is growing faster than its wheat supply. The price of bread has increased and is likely to increase still more.

When it was said in the Bible that "all flesh is grass," the words could be applied in more senses than one. The existence of the human race as a whole to-day depends on grass. The particular grasses upon which mankind lives are called cereals, and we eat the fruits, or seeds, of these grasses, the food matter in which has been made by the leaves.

The first practical point to notice about this cereal food is its cheapness. Roughly speaking, a vegetable food costs, on the average, only about one-fourth as much as animal food. Bread made of wheat is the cheapest of all foods. This reckoning is made, not by outside weight, but by the weight of what in the bread is actually food and used as food. Comparisons by mere weight are absurd, for we may be weighing water or woody fibre or bone. The nearest food to rival bread for cheapness is oatmeal. Further, good wheat flour is cheaper than all other foods, if we reckon its protein only, and we know how tremendously important protein is. Bread is much dearer than flour, but even bread, so far as its protein is concerned, is still cheaper than milk, meat or eggs.

The difference in price between flour and bread is so great as to make it a pity, except from the baker's point of view, that people no longer bake at home as they used to do. A recent writer has said that bread is one of the cheapest foods, not only with regard to the actual weight, but also with regard to the variety of the nourishment contained; and the purchaser who spends a few cents in buying a loaf of bread may rest assured that he could hardly spend his money to better advantage.

WHY THE WHITEST BREAD IS NOT THE PUREST BREAD

Just as we find that a given kind of milk is perfectly composed for the needs of the young creature for which

it was made, so we find that the wheat plant does its work perfectly for its own needs; for the wheat grain consists partly of the germ of the young plant and partly of material supplied for it to live upon. The food material constitutes the greater part of the wheat grain, and it consists mainly of starch and is deficient in protein and fat. We therefore have a good sound reason for eating bread with cheese or butter.

The science of bread-making is really of national importance. It is possible to treat the wheat grain in such a fashion that very little gets into the flour but the starch. This produces an extremely white loaf, much admired by those who know no better. The whitest loaf is the starchiest and the least rich in protein, for it sacrifices the germ of the grain, in which most of the protein is contained. By recent methods of bread-making, however, what is called germ-bread is produced, which means that the germ that used to be lost is saved for the flour. On such bread, together with water, man could probably live for a long time.

THE DIFFERENCE BETWEEN BROWN BREAD AND WHITE BREAD

The covering of the wheat grain is called bran. The bran and the germ contain coloring matter, and if they are used we get a brown bread. Many people suppose that brown bread is superior, and this has been argued on scientific grounds. This is not entirely true. In the first place, brown bread is very much wetter, so that we are paying a great deal for water; and, in the second place, the bran, which is really woody, may interfere with the digestion of the food materials in the flour. The result is that the protein of brown bread is not absorbed as it should be, and the bran may interfere with the absorption of other things, such as milk. This is quite contrary to what is generally believed, but that makes it all the more necessary and important for us to know it. On the other hand, the bran may help us to get rid of waste matter from our bodies.

The crust of bread is more valuable than the crumb simply because the crumb is so largely water. It is very wasteful indeed not to eat our crusts. Apart from the richness of the crust in food material, there is the fact that biting it is good for the teeth. This is especially true of children's teeth, and one of the reasons why our teeth are so bad nowadays is that they were not properly exercised when they were young. There is no living power or structure that will not be injured if its work is done for it.

If we cook bread and turn it into toast or rusks, or if we make crackers, we produce a very nourishing kind of food which is also much more digestible than ordinary bread because it is much drier. When we eat the crumb of new bread we find it difficult to digest, because it can scarcely be chewed and because it is so wet. If it is very wet, it cannot suck up the juices of the mouth. We have already learned that the digestion of starch and the turning of it into sugar depends partly on the saliva, and bread is a very starchy food. We should therefore take it stale, or in the form of toast, crackers, or crusts. These are so dry that they soak up the saliva of our mouths if we are careful to chew them well.

SOME GREAT QUESTIONS THAT WE MUST CONSIDER ABOUT WHEAT

Wheat is the best of all the grasses on which mankind feeds, but there are others of great importance. There is, for instance, rice, on which, as we have said, the ancient civilizations of the East are founded.

Rice is not very digestible: it contains a great deal of starch and much less protein than wheat. It is improbable that Western civilization, with its great activity, could be maintained upon rice. It may well be that on rice there is possible only the more slowly moving life of the East. Of course, these things are not certain, nor have we the right to say that our activity and restlessness are always wise, but it is probable that the great food differences play a considerable part in this matter. It is best to cook rice by steaming, and we should try to remedy its lack of protein by adding egg or cheese.

Corn is much used in America, and can scarcely be overpraised. It is very cheap, very nourishing and very well absorbed. Cornstarch is a food stupidly made from maize in such a way as to get practically nothing but the starch; and it is therefore on the same level as arrowroot, which is really just starch—an inferior order of food altogether.

Oats are the last cereal we need mention, but they demand special notice. We find that when a grass grows in a cold country, it prepares for its offspring a

high proportion of heat-producing material; whereas, if a grass grows in the tropics, it will be poor in such material. Thus oats, which grow in the North, contain a lot of fat; while rice is specially poor in fat, and therefore the less suitable for a northern civilization. The fat in oats is valuable, of course, and we have already seen that this cereal is very rich in protein. The strength and size of the Scotsman at his best, and his capacity to withstand his climate, probably depend in no small degree on the excellence of oatmeal as a food and its richness in the substances needed in such a climate.

How the people's food is changing for the worse in Scotland

Much less attention than is needed has yet been paid to the preparation of oatmeal. Only people whose digestion is very strong can deal with large quantities of the ordinary oatmeal, which contains a great deal of husk besides its fat. The new "rolled oats" are much easier to digest, but they are prepared in a way which rather reduces, though not by very much, the amount of nourishment in them. The manufacturers have yet to learn how to get rid of all the husk without losing anything else. Oatmeal is very well absorbed by those who can take it. The child who enjoys oatmeal and milk for breakfast is fortunate.

Nothing can surpass this combination for children, and therefore the world owes more to it than we recognize. So important is this question that we ought to spare no trouble in cooking oatmeal so that it can be taken even by children. We should find the right kind of oatmeal, cook it in the right way, and add to it what it needs to make it pleasant to eat.

Two great changes have been going on for some years in the large cities of Scotland. Careful inquiry has shown that the diet of the poorer people is changing. They used to get oatmeal and milk—or, at any rate, oatmeal—before school; nowadays they get starchy bread and jam, and, compared with oatmeal and milk, such a diet is rubbish.

Why Scottish townsfolk are losing height and weight

Now, these same cities show us a change. This is a very rapid and intense damaging of the people. Properly fed on oatmeal, and under good conditions, the Scotsman is, on the average, the tallest and heaviest man in the world; but the younger generations in the big Scottish cities, fed largely on starchy bread and jam, are promising to become, very soon, quite a small race. They are already dwarfed by inches. Few things more terrible anywhere are going on than this destruction of the quality of life in such places as Edinburgh, Glasgow and Dundee, in a land which has for so long been prominent in many matters and, best of all, in the right feeding, education and upbringing of children.

In our study of food, and especially of the cereals, we must beware of forgetting the importance of other things. We must not suppose that the destruction of the city populations in Scotland is due entirely to the change in their food. It is also due, in Dundee, for instance, to matters of feeding in the first year. The mothers go out to work in factories, and the future life of Scotland is left to chance at home. It is also due partly to the fact that men and women of poor physique, fit for industrial life but unfit for agriculture, go to factory towns.

But the contrast between a diet of oatmeal and milk and a diet of bread and jam is one we must especially remember. Bread and jam is very well in its way, but it is not a good breakfast for a child who has to trudge to school and do his lessons. Now let us think rightly about the bread we eat. When we cut a piece of bread and put it into our mouths, what are we doing from the point of view of the life of the earth on which we live?

The whole strength of our food comes from the sun

We know that the whole animal world depends on the green vegetable world, which depends on the sun. Bread does not happen to be green. It was made *in* the green leaves of grass: it is not actually made *of* them, but of the grain they make. Thus, when we take a piece of bread we are likely to forget that we are really eating grass, which is transformed sunlight, air and soil. We are putting these things—the energy of sunlight, the carbon from the air and the other things from the soil—into our mouths; and the whole animal world, from the little ameba of the ponds up to the greatest human being, lives to-day, and has always lived, on grass. This is true even if we prefer a diet of nothing but meat and hot water, for the meat was made from grass.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 2567.

PRESIDENT LINCOLN AND HIS CABINET DISCUSSING EMANCIPATION

This famous picture represents President Lincoln reading the Emancipation Proclamation to his Cabinet. On September 22, 1862, it was announced that slaves in the seceding states would be declared free on January 1, 1863, unless the states returned to the Union. No state returned, and the proclamation was issued. The seated figure at the left is Edwin M. Stanton, Secretary of War, while Secretary Chase of the Treasury stands beyond him. Secretary Seward is seated in front, and Gideon Welles, Secretary of the Navy, is across the table. The seated figure behind Secretary Seward is Edward Bates, the Attorney-General, while Caleb B. Smith, Secretary of the Interior, and Montgomery Blair, Postmaster-General, stand in the background The picture was painted by F. B. Carpenter, and is in Washington.

THE HISTORY OF THE UNITED STATES

YOU were told in the last volume of the growth of the great West, and also how new states were made. You learned that some of the new states allowed slavery and some did not, and that often there was a fierce dispute over the question, as the South wished to keep the number of slave states equal to the number of free states. Now we are to learn that the South failed in this attempt and that the growth of the Republican party was thought to be dangerous to Southern interests. Then we learn of the great war which followed the attempt of eleven states to leave the Union and form a new nation. We shall find that often brother fought against brother, and that for four years one of the greatest wars in history was fought. Finally the Confederacy was overcome, the slaves were set free, and the states returned to the Union.

THE BROTHERS' WAR

CONTINUED FROM 2291

IN our last story we followed the history of Our Land a little beyond the point where our country reached to the Pacific Ocean. From thirteen states, all bordering on the Atlantic, it had grown, before 1861, into thirty-four states with a large amount of territory not yet ready to be made into states. The population had grown from about 4,000,000 people into about 32,000,000, and the increase in wealth had been rapid.

Men had swarmed over the mountains and crossed the plains. Railroads and canals had been built, and steamboats were on the rivers and lakes. Thousands of inventions had been made to do the work formerly done by hand. Thousands of factories were turning out goods of every kind. Mines had been opened, and forests had been cleared away. Schools and colleges had grown in number and in size. Great newspapers had been established, and many books were printed every year.

DISAGREEMENTS WHEN THE CONSTITUTION WAS MADE

Now we come to tell of the great war which was fought between the states. As the result, nearly a million men lost their lives and an immense amount of property was destroyed. But this war did not really begin in 1861, though the first battles occurred then. It began early in our history, and in order to understand the war we must go back and understand some other things first. We have learned in other volumes that there was jealousy between different sections at the time the Constitution was adopted. The Southern states were farming states, while the New England states were trading states, though manufacturing soon became important. The farming states wished to buy the goods they needed where they could get them cheapest, and wished them carried as cheaply as possible. The New England states wished laws putting a tax on foreign ships, so that they might get all the business.

On the other hand, some of the Northern states wished to give Congress power to forbid the bringing of any more negroes from Africa, to which some of the Southern states would not consent. So it had been agreed that Congress might pass navigation laws and might forbid the slave trade after twenty years. There had been other disputes about whether slaves should be counted in laying taxes, and in deciding upon the number of Representatives in Congress a state should have. These had been settled by counting five blacks as equal to three whites in counting population for these purposes. The blacks did not vote, and so the whites had more influence than in the North.

NORTH AND SOUTH WERE DIFFERENT FROM THE BEGINNING

Then there were differences in the people themselves. The settlers of the New England states came, for the most part, from the English towns, and they settled in many little towns. A large part of the settlers of Maryland, Virginia and the Carolinas came from the country and hoped to build up large estates in their new homes. After Charles I was put to death in England, many of his followers came to Virginia. While some members of the English aristocracy settled in the North and many men of Puritan ideas came to the South, we may say that New England was Puritan in sentiment and that the South was aristocratic in some sections, though not in all.

In the early days of our country, the farms in the North, except on the Hudson River, were small, while in the South there were many large estates. The wealthiest and most prominent people in the North lived in towns and made their money from commerce, while in the South this class lived on large plantations. Slave labor was not profitable in the North, while, after the invention of the cotton gin, many slaves could be employed in the South. The North turned early to manufacturing, while the South bought most of the manufactured goods it needed from the North or from Europe.

SOME OF THE POINTS ON WHICH THE SECTIONS DIFFERED

All these differences existed before the year 1800, and many men saw that the sections were likely to grow more unlike as the years went on. There were disputes about many things, but the one which was most in the public eye was the question of slavery.

You may ask which states were Northern and which Southern. Pennsylvania and Maryland quarreled for nearly a hundred years over their boundary line. Finally it was settled, and two English surveyors, Charles Mason and Jeremiah Dixon, began to mark the line in 1763. After a time men began to speak of Mason and Dixon's Line as the dividing line between North and South.

As we have told you before, all the colonies held slaves at first, but since slaves were not profitable in the North, they were set free or sold. Few people anywhere thought slavery wrong, though many thought it unwise. One of the strongest enemies of slavery was Thomas Jefferson, though he owned slaves; and many other Southerners also wished to get rid of slavery, though no one could see exactly how it could be done, nor what would become of the negroes if they were set free.

You have already been told that the South tried to keep the number of slave states equal to the number of free states, and have been told of the Missouri Compromise, which was then thought to settle the question, but it was settled only for a short time. The cause of further trouble was the increase of the number of people called abolitionists. These abolitionists believed that slavery was wrong and ought to be abolished in spite of the Constitution and the laws.

THE ABOLITIONISTS BEGIN THEIR FIGHT ON SLAVERY

Newspapers to advocate this belief were printed. At first the abolitionists were not liked in the North any more than they were in the South. In Boston, Philadelphia and other cities they were attacked and beaten when they tried to speak. In some places their printing offices were destroyed, and some of the editors were killed by mobs. In 1833 a school for negro girls in Connecticut was broken up, and the teacher was sent to jail. The abolitionists did not stop speaking and writing, and after a time more and more Northern and Western people began to think as they did. In the South they were thought to be as dangerous as men with torches going around at night setting fire to houses.

After the Mexican War, of which you read in the last chapter, the North wished to shut out slavery from the territory gained from Mexico, and wished to admit California as a free state. The South was not willing, and the Compromise of 1850, which was introduced by Henry Clay, followed. This agreement admitted California as a free state, did not forbid slavery in the other territory, but did forbid any slave to be brought into the District of Columbia for sale, and declared that a stricter law for sending back runaway slaves to their masters ought to be passed.

HOW THE FUGITIVE SLAVE LAW CAUSED TROUBLE

This Fugitive Slave Law, as it was called, was much disliked in the North,

and in many states was not obeyed. When the officers of the law arrested runaway slaves, their prisoners were often taken from them by mobs, and the abolitionists declared that even if the Constitution did say that runaways must be sent back, there was a "higher law" than the Constitution, and that they were right to disobey the laws of Congress.

In the first fifty years of the Union many young men went from the South to Northern colleges and many Northern men went South to teach. But as the dislike and suspicion between the sections grew, this happened less frequently. The Southern people sent to England and France for their books and magazines, as they found themselves attacked in the Northern works. The disputes even entered some of the churches. The Methodists, Baptists and Presbyterians divided themselves into Northern and Southern branches, and so the people of the sections had less and less to do with one another.

A BOOK WHICH HELPED TO BRING ON WAR

In 1852 a book was published which helped to arouse the people against slavery. This was Uncle Tom's Cabin, written by Harriet Beecher Stowe, a sister of the famous preacher, Henry Ward Beecher. It showed both the best and the worst of slavery, but paid more attention to the worst. It also made clear the fact that the death of a kind owner, or his failure in business, might separate families and bring his slaves in the power of a brutal man, who would abuse them. Thousands of copies were sold, and the book was translated into several languages. Men in the North who had never thought much about slavery became strong enemies after reading the book.

THE KANSAS-NEBRASKA BILL INTRODUCED BY STEPHEN A. DOUGLAS

Now a dispute arose about what was called the Nebraska country. Senator Stephen A. Douglas, of Illinois, in 1854 reported a bill organizing the two territories of Kansas and Nebraska, giving the inhabitants the right to say whether they wished slavery or not. He and those who voted with him said that the Missouri Compromise, which forbade slavery north of 36° 30′, had been done away with when the Compromise of 1850 was passed, and that the people of a territory knew best whether they wished slavery or not. This idea was called "squatter sovereignty." This bill passed after a fierce discussion, and both North and South sent men to Kansas, each trying to get the majority. It is said that men who really lived in Missouri went into Kansas and voted. For two years there was fighting, but finally the free-state party got control. When the Kansas-Nebraska Act was passed, one abolitionist, William Lloyd Garrison, publicly burned a copy of the Constitution, saying, "The Union must be dissolved."

A NEW PARTY IS FORMED TO FIGHT SLAVERY

Other abolitionists did not believe this, and a new political party was formed to oppose slavery. This was made up of men from both the Whig and the Democratic parties who had come to believe that something must be done to prevent the spread of slavery. The new organization was called the Republican party, but before this the Liberal party had had a candidate for president in 1844, and four years afterward the Free Soil party got many votes. Later most of its members joined the new Republican party. One of the things which made many men join the new party was the Dred Scott Decision by the Supreme Court. This declared that Congress had no power to keep slavery out of a territory, and that a state itself was the only body which could decide this question.

We have named no presidents after Polk. He was succeeded by General Taylor, the hero of the Mexican War, who soon died in office, and Millard Fillmore, the vice-president, succeeded him. Then a Northern man, friendly to the South, Franklin Pierce of New Hampshire, became president. In 1856 James Buchanan of Pennsylvania, another friend of the South, was elected, though the Republican candidate, John C. Fremont, of whom you read a few pages back, carried most of the Northern states.

Until this time the South had generally controlled the government. From the beginning of Washington's first term until the Civil War was seventy-two years. During that time Southern-born presidents had been elected for terms amounting altogether to fifty-two years, while only five Northern presidents had been

elected for one term each, or twenty years in all. Now, the South knew that the North had increased so much faster in population, and the Republican party was growing so rapidly that it would soon be in control. Just then, in 1859, something happened to excite the South still more.

JOHN BROWN AT HARPER'S FERRY IN VIRGINIA

John Brown had been engaged in the riots in Kansas, and had done his share of the bloody work there. He determined to stir up the slaves to rise against their masters. In 1859, with a few followers, he appeared near the village of Harper's Ferry, Virginia (now West Virginia), where the United States had an arsenal, or storehouse, for weapons of war. On the night of October 16, 1859, he captured the arsenal, expecting that the slaves in the neighborhood would soon flock to him. After being supplied with arms, they were to be sent out to burn the houses of the whites, and kill the men, women and children. Brown thought that this would frighten the Southerners so much that they would abolish slavery.

But things did not turn out as he expected. The negroes did not come to aid him, but the white men from the neighborhood assembled, and surrounded the arsenal. Finally some United States marines were sent and he and his companions were captured. He was tried and hanged, but many of the abolitionists approved his plan, and called him a martyr. Nowadays most people believe that he was partly insane from thinking so long on the subject of slavery.

In the South the story of John Brown's plan and the news of the fact that many people in the North approved of it, stirred up many people who had hoped that the quarrel between the sections could be settled, and more and more people began to talk of leaving the Union.

ABRAHAM LINCOLN ELECTED PRESIDENT, SOUTH CAROLINA SECEDES

When the time for electing another president came, in 1860, the Republicans nominated Abraham Lincoln, about whose life you may read on page 1045. The Democratic party split into two parts, one nominating Stephen A. Douglas, and the other John C. Breckinridge of Kentucky. Some other men, who called themselves the Constitutional Union party, nominated John Bell, of Tennessee. Because of the number of candidates Lincoln was elected, though he did not get a majority of the votes.

As soon as it was known that Lincoln was elected, a convention was called in South Carolina to decide what that state would do. On December 20, 1860, this convention repealed the act by which it had ratified the Constitution seventy-two years before, and declared that the state was again independent as it had been before it accepted the Constitution of the United States. During the next few weeks, Mississippi, Florida, Alabama, Georgia, Louisiana and Texas followed the example of South Carolina. The other states which allowed slavery were Maryland, Delaware, Virginia, North Carolina, Kentucky, Tennessee, Arkansas and Missouri. These states did not wish to secede, though they sympathized with the other slave states.

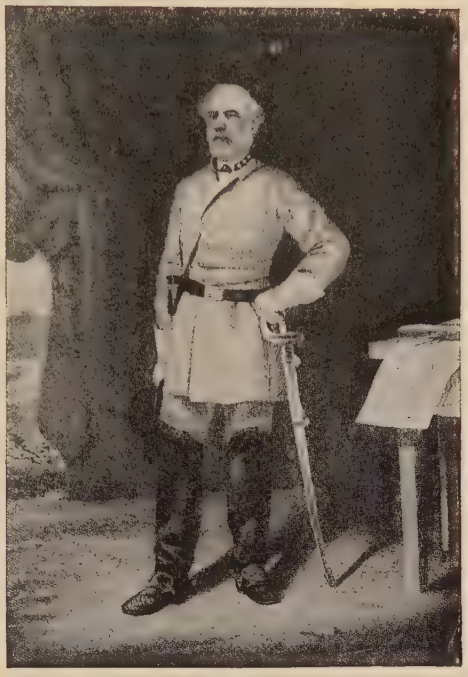
THE CONFEDERATE STATES GOVERNMENT IS ORGANIZED

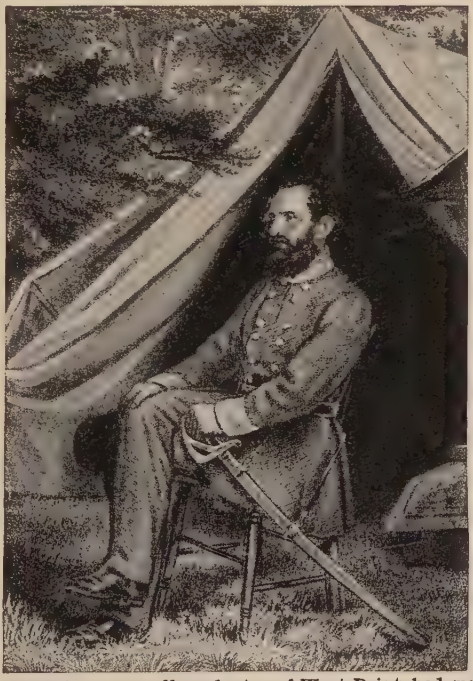
In February delegates from the seven seceding states met at Montgomery, Alabama, and organized a government which they called the Confederate States of America. Jefferson Davis, of Mississippi, was elected president, and Alexander H. Stephens, of Georgia, vice-president. With a few changes they adopted the Constitution of the United States. Nearly all the United States forts, shipyards and arsenals were taken, as it was said that a foreign government had no right to hold territory in their country. Fort Sumter in Charleston harbor, and a few others, had United States soldiers in them who were not willing to surrender.

Many of the officers of the army and navy who had been born in the South resigned and went to their native states. They had been taught from childhood the doctrine of States' Rights, and said that a man's first duty was to his state and not to the nation. So we shall see that very often the opposing generals had been at West Point together.

President Buchanan was an old man who loved the Union and could not bear to think of seeing it destroyed. He did not believe that a state had a right to secede, but at the same time he did not believe that the Union had any right

FOUR CONFEDERATE LEADERS





These four men, all graduates of West Point, had most to do with the Confederate armies. Jefferson Davis had been Secretary of War in President Pierce's Cabinet. Robert E. Lee, before Virginia seceded, was offered the command of the United States army, but refused, and for four years fought for the independence of the Confederacy. Thomas Jonathan Jackson, better known as Stonewall Jackson, was Lee's most trusted lieutenant, and was perhaps the greatest military genius of the war. He was accidentally shot by his own men at Chancellorsville. Joseph E. Johnston was not a reckless officer and some thought him too cautious, but he was a general respected by soldiers, though President Davis did not like him.

to prevent it by force. So during the last months of his term he was very unhappy and did not know what to do. He did send a ship with provisions for Fort Sumter, but when it was not allowed to land them, did not send an armed vessel to force the men in Charleston to allow the supplies to be landed.

WHY THE SOUTHERNERS THOUGHT THEY WOULD SUCCEED

Soon Lincoln was inaugurated president, but many efforts to prevent war were made. The men who had made the Confederacy did not believe that the North would fight, but if war did come, they thought that all the slave states would join them, that they would get much help from Northern men opposed to the abolitionists, and from Europe. They supposed that England could not do without their cotton and would soon force the North to make peace. In all of these things they were disappointed, as we shall see.

Lincoln finally determined to send supplies and reinforcements to Fort Sumter. When the news reached the South, it was decided to capture the fort. Firing was begun on Friday, April 12, 1861, and on Sunday afternoon the fort surrendered. Though it had been much damaged, and had been set on fire by the bursting shells, not a man on either side had been killed. Five days later some Union troops marching through Baltimore were attacked by a mob, and several were killed.

These two events were like a match in powder. Up to this time many men in the North had believed it better to let the states go if they insisted. Now everybody was in favor of war. In the Confederacy it was felt that they had gone too far to go back.

FOUR OTHER STATES SECEDE

The next day President Lincoln called for 75,000 men to volunteer as soldiers. Every state was called on for its part of that number. The slave states which had not seceded were now forced to decide whether they would fight with the South or with the North. Virginia at once seceded, followed by Arkansas and Tennessee, and at last on May 20, 1861, North Carolina joined the Confederacy. Richmond was made the new capital, and the Confederate government moved there.

Kentucky attempted to remain neutral, but this was not allowed, and the state stayed in the Union. In this state the people, and even families, were much divided. In many cases brothers fought on different sides. Missouri was also divided, but the Union men succeeded in preventing secession. Delaware and Maryland were north of Washington and stayed in the Union, though at first Maryland was restless. The western counties of Virginia were opposed to secession, and were made, during the war, into a new state called West Virginia.

THE NORTH AND SOUTH AT THE BEGINNING OF THE WAR

Now let us see something about the two sections. The eleven seceding states had about 9,000,000 people, but about 3,500,000 of these were slaves. The nineteen free states and the four slave states which did not secede had 22,000,000 people. The North had many mills, factories and ships; the South had very few, as agriculture was the chief business. There were more railroads in the North, and more cities and towns.

You would think at first that the South would be beaten at once, but it had some advantages. In the first place, nearly every Southern soldier could ride and shoot when he joined the army, and he knew also something about life in the open air. Many Northern soldiers had never fired a gun nor ridden a horse before they enlisted. Then, too, the negroes could do many things which soldiers did in the Union army, such as driving wagons, taking care of horses and the like. Lastly, most of the battles were fought on Southern soil, and an invading army needs men to guard the road by which it gets its supplies.

THE UNION FORCES START FOR RICHMOND, BUT DO NOT GET THERE

When President Lincoln called for troops after the capture of Fort Sumter, they came quickly and soon the officers were drilling them around Washington. They were only a mob, for it takes time to make soldiers, but the people of the North were impatient, and the newspapers and public speakers kept crying, "On to Richmond." The generals knew that the Union forces were not ready to fight, but many of the men had joined only for three months, and their time was almost up. So on July 16, 1861, about 35,000 men under General Irvin

McDowell marched out of Washington toward about 23,000 Confederates, commanded by General Beauregard, who had been at West Point with General McDowell. They met, July 21, at a little stream called Bull Run, near the village of Manassas.

At first the Union forces seemed to be successful, and the Confederates gave way, but General T. J. Jackson "stands like a stone wall," the Union troops were checked, and victory seemed trembling in the balance. Just then 8,000 fresh Confederate troops came up, the Union forces were thrown into a panic, and did not stop until safe in Washington.

This battle encouraged the Southerners, and many thought that the war was over. It showed the North that the war would not be over in three months, as had been expected. So General George B. McClellan, who had been successful in defending western Virginia, was put in command and began to make an army out of the unorganized forces.

WHAT THE UNION FORCES WERE TRYING TO DO

There were over 2,400 battles, great and small, during the war, and 112 were real battles. We cannot mention all of these, but can tell only of the most important. The Union forces were trying to do several things: (1) to capture Richmond; (2) to blockade the Southern ports, thus preventing the Confederates from sending out cotton and bringing in supplies of all kinds, bought with the money thus gotten; (3) to gain the Mississippi River and in that way cut the Confederacy in two; (4) to drive the Confederates out of Kentucky, capture Tennessee, and so reduce the territory held by them.

Early in 1862 the Confederates held two forts in Tennessee, one, Fort Henry, on the Tennessee River, and the other Fort Donelson, on the Cumberland River, only fifteen miles apart. The first named was attacked in February, 1862, by gunboats under Commodore Foote and troops under General U. S. Grant, whom we shall hear more about later. Fort Henry was easily taken, but the garrison escaped to Fort Donelson, which was then attacked. In a few days it, too, was taken, and 15,000 men were captured. The capture of these forts forced the Confederates to give up most of Kentucky and Tennessee.

THE BATTLE OF SHILOH, WHICH WAS WON BY BOTH SIDES

These were not the only contests in the West. General Grant moved to Pittsburg Landing on the Tennessee River, and stopped there with 45,000 men. General Albert Sidney Johnston with 40,000 men decided to attack him. General Johnston had had an unusual career. He had graduated at West Point in 1826, two years before Jefferson Davis. In 1834 he resigned from the army, settled in Texas and soon became the commander of the Texan forces in the struggle for independence. After Texas was annexed to the United States, he won golden opinions in the war with Mexico. At Monterey, three horses were shot under him. After the war he again joined the United States army, and led the army to Utah, about which you have been told before. At the beginning of the Civil War he resigned and was appointed a general in the Confederate army.

Without warning on April 6 he attacked the Union forces near Shiloh Church, drove them back to Pittsburg Landing, and seemed about to capture the whole army, but was wounded and died fifteen minutes afterward. General Beauregard, the same who bombarded Fort Sumter, succeeded to the command, but halted to rest his men. During the night the Union forces received 24,000 fresh men, and the next day Beauregard was forced to retreat. In a few weeks more the Confederates lost control of the Mississippi River down to Vicksburg in Mississippi. A large part of the Union plan had succeeded in the West.

HOW A GREAT UNITED STATES NAVY WAS CREATED

Now what of the blockade of Southern ports? At the beginning of the war the navy was small and widely scattered, but every effort was made to increase it. Remember that this was before the days of iron ships. Now, it takes several years to build a warship. Then, anything which could carry guns was used. Merchant vessels, river steamboats, and even ferry boats ordinarily used to carry passengers across rivers became a part of the blockading fleet.

Late in 1861 Hatteras Inlet, on the North Carolina coast, and Port Royal, in South Carolina, were taken, and also something happened which almost brought on a war with England. The

Confederate government had sent James M. Mason and John Slidell to Europe to try to get Great Britain and France to recognize the independence of the Confederacy. They were taken from the British ship Trent by a United States warship and carried to Boston. Great Britain was very angry and if the men had not been given up at once might have declared war, though she had claimed the right to stop and search ships until 1856.

THE MERRIMAC AND THE MONITOR, THE FIRST IRON SHIPS

When the United States Navy Yard at Norfolk was abandoned, a new vessel, the Merrimac, was sunk. The Confederates raised her, cut off her sides, added a sloping roof of iron, and renamed her the Virginia. On March 8, 1862, she came out and destroyed the Cumberland and the Congress. The heavy shot of these ships made little more impression on her than tennis balls would have done. The next day when she came out to finish the destruction of the Union fleet, she was met by a little "cheese-box on a raft," which had arrived from New York the night before. This was the Monitor, also an ironclad of a new type, which had been invented by a man named Timby and improved by a Swedish engineer, John Ericsson. For five hours the two ships fired at each other. Neither could do the other much harm, but the Merrimac (or Virginia) was no longer so much dreaded, and a few months later was destroyed by the Confederates when they gave up Norfolk.

FARRAGUT ENTERS THE MISSISSIPPI AND TAKES NEW ORLEANS

Another Union success was the capture of New Orleans by Commodore Farragut. This officer, though born in Tennessee, did not join the Confederacy, but on April 24, 1862, led his fleet up the Mississippi River, in spite of the fire of Forts Jackson and St. Philip, and on the next day took possession of New Orleans.

But what of the Army of the Potomac which General McClellan had been drilling? For many months it remained quiet, but finally in March, 1862, General McClellan began to move toward Richmond, but by a very roundabout way. At Yorktown he was delayed for a month, and after the town was captured, found that some of the guns which looked so dangerous were painted logs of wood. Twelve thousand men had held back a hundred thousand. Slowly McClellan advanced toward Richmond and at one time was within four miles of the city.

STONEWALL JACKSON IN THE SHENANDOAH VALLEY

But he could not get more men because of Stonewall Jackson. That officer with a small force moved into the Shenandoah Valley to threaten Washington. He drove General Banks across the Potomac, and though three armies tried to capture him, he was always able to fight and then to escape. With less than 25,000 men altogether, he had beaten 60,000 at different times, alarmed Washington and saved Richmond. It had been intended to send some of the Union troops to help take Richmond, but Jackson kept them all busy.

Meanwhile General McClellan had been defeated at Seven Pines, or Fair Oaks. General Johnston was wounded and was succeeded by General Robert E. Lee, who held the chief command on the Confederate side until the end of the war. After the Seven Days' Battle (June 25-July 1) McClellan was forced to retreat without capturing Richmond. Many of his troops were taken from him, and a new army was formed to defend Washington.

Next Lee turned to meet General Pope, who had been successful in the West, and now commanded the troops in front of Washington. With the assistance of Stonewall Jackson, Lee inflicted a crushing defeat at the old battlefield of Bull Run (August 29-30), and captured a large quantity of supplies. General Pope had boasted of what he was going to do too soon.

GENERAL LEE NEXT INVADES UNION TERRITORY

General Lee now determined to invade Maryland, and at Sharpsburg (or Antietam) met McClellan, who had again been put in charge of the Army of the Potomac. The latter got a copy of Lee's plan of campaign, but was too slow to use it. Though he had about 90,000 men to Lee's 50,000, neither general could really claim the victory, but General Lee changed his plans and returned to Virginia. More men were lost on the second day than on any other day during the war (September 17).

It seemed that Lee could not be beaten by a careful general, and so a reckless

TWO NAVAL BATTLES OF THE WAR

From an old drawing, photo by Ewing Galloway.

This was the first battle of iron ships. The Merrimac was a regular frigate cut down, with a sloping roof of iron added. The turret of the Monitor revolved so that its two heavy guns could be fired in any direction. They met March 9, 1862, and fought for hours. The Merrimac had destroyed the wooden ships Congress and Cumberland the day before, and but for the Monitor might have destroyed the Union fleet.

The most noted of the Confederate privateers was the Alabama, built and launched in England, in spite of the objections of the United States. Commanded by Captain Raphael Semmes, she almost drove the merchant vessels of the United States from the seas between 1862 and 1864. On June 19, 1864, she unwisely sailed out of the harbor of Cherbourg, France, to fight the United States vessel Kearsarge, and was sunk.

one, General Burnside, was next sent against him, but was defeated with terrible slaughter at Fredericksburg, though his troops fought with wonderful bravery (December 13, 1862).

In the last months of the year there was again heavy fighting in the West, in which the Union forces were generally successful. At Perryville, Corinth and Murfreesborough, the advantage was with them, though in some cases both sides claimed the victory. But on the other hand, two attempts to capture Vicksburg failed.

PRESIDENT LINCOLN SETS THE SLAVES FREE

The beginning of 1863 was marked by the Emancipation Proclamation on New Year's Day. In this President Lincoln declared all slaves in the seceded states to be free, but said nothing of those in the slave states which remained in the Union.

Still Richmond was not taken, and another general, "Fighting Joe" Hooker, was chosen to oppose Lee. The armies met at Chancellorsville May 2, 1863. General Lee again divided his army and sent Stonewall Jackson to strike on the Union flank. The attack was successful, but Jackson fell from the fire of his own men, who mistook his escort for Union cavalry, and Lee said that he had "lost his right arm."

General Lee now made the mistake of again invading the North and marched into Pennsylvania. Hooker was succeeded by General George G. Meade. The armies met at Gettysburg, and for three days (July 1, 2, 3) the battle raged. The first day the Confederate forces had the advantage and the second day also, but the Union forces had thrown up entrenchments, and early on the third day were able to regain the positions which had been lost. General Lee determined to break the Union centre, and sent 13,000 men under Pickett and Pettigrew to do it. The charge is one of the most famous in all history, but it failed, and General Lee retreated.

THE MISSISSIPPI IS OPENED BY THE CAPTURE OF VICKSBURG

Though he had failed the year before, General Grant was determined to take Vicksburg, and finally, July 4, 1863, the day after the victory at Gettysburg, the city surrendered. The Mississippi was now lost to the Confederacy. One of the great objects of the war was entirely accomplished. Arkansas, Louisiana and Texas were cut off from the rest of the Confederacy.

In Tennessee, however, the Confederates were rather more successful. At Chickamauga, the Confederate General, Bragg, assisted by Longstreet, whom General Lee had sent to his aid, defeated General Rosecrans, and the Union army would have been entirely routed but for General Thomas, who stood firm as a rock, though he lost many men. This was on September 19–20, 1863. The Union army was now shut up in Chattanooga and besieged there by the Confederate troops who occupied the hills surrounding the city. It seemed that Union success in the West had been checked.

General Grant was now placed in command of all the armies in the West, reinforcements were hurried to the city, and in a series of battles the Union forces were successful. Lookout Mountain, "the battle above the clouds," was fought on November 23, and the next day Missionary Ridge was also taken, and the Confederate army forced to retreat into Georgia.

THE CONFEDERATE HOPES GO DOWN AFTER GETTYSBURG

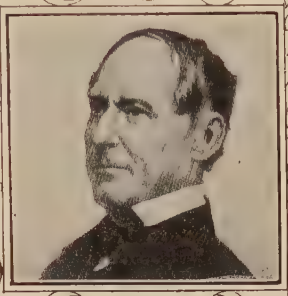
Until after Gettysburg and Vicksburg Confederate success seemed possible, and the North was growing more and more tired of the war. From that time the Confederate cause sank. Thirty thousand men had been surrendered at Vicksburg, and the veteran soldiers lost at Gettysburg could not be replaced. Nearly every able-bodied man in the Confederacy was in the army, and as they dropped out from death, disease or wounds, there were few to step forward to take their places. Clothing was scarce, as there were few factories and not many sheep in the Confederate states. There were few railroads, and these broke down as the months went on. Food could not be brought to the army, and much of the time Lee's soldiers did not have enough to eat.

With the beginning of the year 1864 a change was made in the Union plans. The armies had acted separately under orders from Washington. In the West the Confederates had been defeated, but in the East they had been generally successful. So the man who had led the

UNION LEADERS IN THE CIVIL WAR

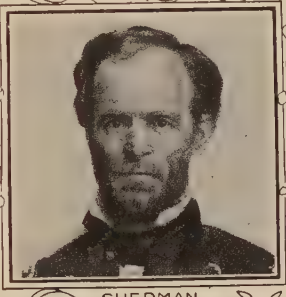
McCLELLAN

HOOKER

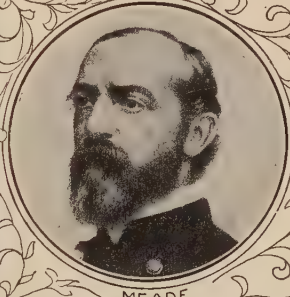


FARRAGUT

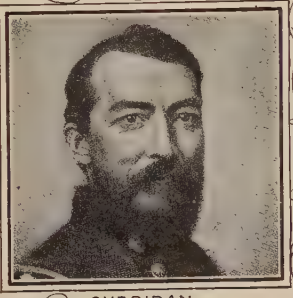
THOMAS



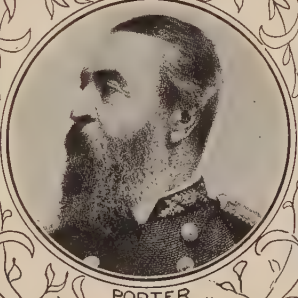
SHERMAN



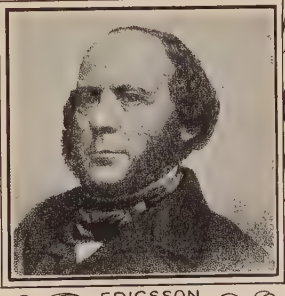
MEADE



SHERIDAN



PORTER



ERICSSON

Here are nine leaders of the Union forces. Though McClellan could not win victories, he organized the army which finally won. Hooker was a good officer, but no match for Lee. Farragut took New Orleans and Mobile, while Porter helped to take Vicksburg and Fort Fisher. Meade won at Gettysburg, Sherman marched through the Confederacy, and Thomas saved the day at Chickamauga. Sheridan was Grant's right hand in Virginia, and Ericsson constructed the Monitor, which checked the success of the Merrimac.

western armies to victory was brought to the East and placed in charge of all the armies of the United States.

General Grant's Plan to Bring the War to an End

His plan was simple: to keep hammering away in the East until he broke down the defenses of Richmond, and to have General W. T. Sherman, in command of the army in the West, keep on attacking the Confederate army under General Joseph E. Johnston, until it had been destroyed. It was expected that the war would be ended during the summer of 1864.

All this seemed possible. The blockade of the Southern ports was now very close. Nearly every harbor was in possession of the Union fleet, thus cutting off all supplies from Europe. Mobile, on the Gulf of Mexico, Charleston, and Wilmington, which was defended by Fort Fisher, had not been taken, but fleets watched the entrances to capture blockade runners.

The Blockade Runners Carry Cotton Out and Goods In

These blockade runners were low, swift steamers painted a dull slate color in order to be as little noticed as possible. Carrying a cargo of cotton and showing no lights, they would slip out of the harbor on a dark night and try to escape unnoticed through the blockading fleet. Once through, they were seldom caught and steamed swiftly to the British West Indies, where they unloaded their cotton and carried back manufactured articles of every kind, medicines and provisions. The return trip was arranged to approach the harbor at night. The most skilled pilots who knew every foot of the coast were in charge, and many boats were able to slip through into the harbors. The profits of this trade were enormous. Cotton which could be bought in Wilmington or Mobile for a few cents a pound in gold was worth, in England, ten to twenty times as much, and the goods taken into the Confederacy also brought large prices. Two successful trips would more than pay the cost of a boat, and even if only a few trips were made before the vessel was captured, the owners could easily afford to buy another boat from the profits. One boat made sixty-four trips, and another twenty-one. North Carolina owned a very successful blockade runner.

Mobile and Wilmington are Taken at Last

Finally, in August, 1864, Mobile was taken by Farragut, who forced his way into the harbor in spite of the torpedoes, destroyed an ironclad vessel the Confederates had built, and captured the forts. Very few vessels could run the blockade at Charleston, though the city could not be taken by the Union fleet. At last (January 15, 1865), after a heroic defense, Fort Fisher was captured by a combined land and naval attack, and Wilmington was taken. The last port of the Confederacy was closed, with the exception of Galveston, Texas, which was of little use, since it was so far away from the armies.

Though the Confederacy had no regular navy, several steamers were sent out to destroy the commerce of the United States, just as the United States had done to England during the War of 1812. The most famous were the Florida, the Alabama, the Georgia and the Shenandoah, which were fitted out in British ports, though the United States declared that this was an unfriendly act which a neutral nation ought not to allow. Altogether two hundred and sixty United States merchant vessels worth $20,000,000 were captured. All of these privateers, except the Shenandoah, were captured or destroyed before the end of the war. Later Great Britain paid over $15,000,000 for the damage done by these vessels, as it was decided that she ought to have prevented them from leaving her ports.

High Prices Paid for Goods in the South

There was little gold or silver in the Confederacy and the government issued paper money, which soon began to lose its value, until finally it was little more than waste paper. One soldier tells of giving a month's pay for a breakfast of ham and eggs. Before the war ended, a barrel of flour cost $1,500 in Confederate money, coffee brought from $50 to $100 a pound, and at the last could not be had at all. Many manufactured articles in daily use could not be bought at all. Thorns with heads of wax served for pins, matches were not to be had, salt was scarce and brought $20 a bushel. Envelopes were made of wrapping paper or even of wall paper and when once used were turned and used again.

A SCENE ON SHERMAN'S MARCH TO THE SEA

After the capture of Atlanta, General Sherman determined to cut loose from his line of supplies, destroy the railroad and march to Savannah, where he could communicate with the Union fleet. The march began November 16 and Savannah was captured December 20, 1864. His march was accompanied by thousands of vagrants called "bummers," who robbed right and left. Many negroes gathered up their scanty goods and followed the army. Railroads were destroyed, mills and factories burned, and all food not used by the army was destroyed on a strip of land sixty miles wide through the heart of Georgia. There was no force to oppose him, and this showed that the Confederacy could not endure much longer. This picture was made from the famous engraving by Darley and engraved by Ritchie. It shows the soldiers destroying the railroad tracks, pulling down telegraph poles, and also shows the burning houses. A wide strip through the heart of Georgia was desolated.

Now let us go back to northern Virginia in the spring of 1864, when Grant took command of the Union armies as general-in-chief. In May, with more than 100,000 men, he moved forward, and met Lee with about 65,000 in a thinly-settled section of Virginia known as the Wilderness, on May 5 and 6. He lost over 15,000 men but could not drive back the Confederates. Instead of retreating, as other Union commanders had done, he moved to the left to get around the Confederate army, but on May 8 again found Lee in front at Spottsylvania Court House. For ten days there was constant fighting, but Grant could not break through Lee's entrenchments, though he lost many men.

COLD HARBOR, THE FIERCEST BATTLE OF THE WAR

Again Grant turned to the left, but found Lee in front of him at North Anna River, where hard fighting occurred with considerable loss. Again Grant repeated his old plan, and again found Lee in front of him at Cold Harbor with defenses already constructed. On June 3, a desperate assault was made and 7,000 men were lost in an hour. In all, the Union losses were about 10,000, while Lee lost hardly more than 2,000. Within five weeks Grant had lost about 60,000 men, a number almost equal to Lee's whole army, but as these dropped out thousands more were sent forward. Even if he lost two men to Lee's one, his force was so much larger that Lee must finally be overpowered.

It was for this reason that Grant refused to exchange prisoners. He could get plenty of new men, but Lee could not. When prisoners are exchanged they are allowed, by the rules of war, to return to the ranks and fight again. Every Confederate held in prison reduced Lee's forces. Besides this, many of the Union prisoners were not fit to fight when they came out of prison on account of the hardships which they had suffered.

After the battles described above, it was seen that the cost of breaking Lee's line was too great, and Grant swung around to the south of Richmond and began to besiege Petersburg. For months little was accomplished, except that supplies coming from North Carolina to Lee's army were cut off, and the Union army settled down in winter quarters around Petersburg.

SHERMAN STARTS ON THE MARCH TO ATLANTA

But what had Sherman been doing? With 100,000 men he was opposed by Joseph E. Johnston with about 65,000. General Johnston determined not to fight hard, as Lee did, but to lead Sherman farther south. Sherman also was unwilling to fight unless conditions were favorable. So Johnston retreated slowly, destroying railroads and bridges as he passed. Sherman followed, and whenever Johnston fortified a position would send a part of his army around toward his rear and force him to retreat. At last Johnston withdrew into the defenses of Atlanta and prepared to defend the city.

The government of Richmond had grown impatient with Johnston's caution, just as the government at Washington had grown impatient with McClellan two years before. So Johnston was removed, and General John B. Hood was put in his place. But if Johnston had been cautious like McClellan, Hood was as reckless as Burnside. Between the middle of July and the first of September several battles were fought, and Hood was forced to give up the city.

SHERMAN'S FAMOUS MARCH TO THE SEA

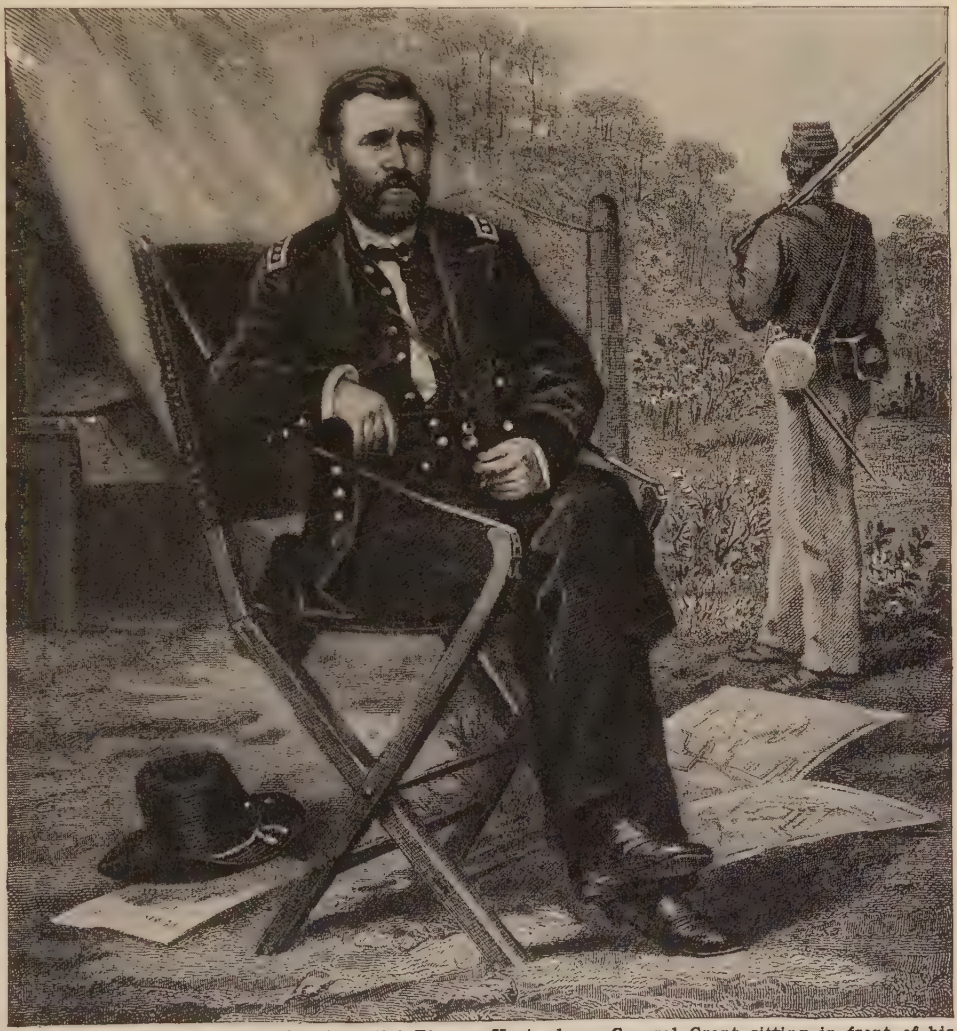
Then he determined to move back into Tennessee, thinking Sherman must follow him. Sherman, however, divided his army, sent half under Thomas after Hood, and himself began his famous "March to the Sea," destroying the railroads and all provisions, shops and factories in a strip of country sixty miles wide. There was no one to oppose him, for only old men and boys were left. The able-bodied men were with Hood or Lee, or in the defenses of Savannah.

Hood first met a part of Thomas's army under General Schofield at Franklin on November 30, and gained the advantage, but Thomas in Nashville did not attack, much to the disgust of Grant and President Lincoln. Finally, when he was entirely ready, he attacked, December 15 and 16, and almost destroyed Hood's army, in what is known as the battle of Nashville.

Meanwhile Sherman had continued his march toward Savannah, which he captured after a siege of two weeks and presented as a Christmas present to President Lincoln. After his men had rested for a month the army started

PLACES WHERE HISTORY WAS MADE

At the left is the Capitol of Virginia, where the sessions of the Confederate Congress were held; at the right, the house of Mr. McLean at Appomattox Court House, Virginia, where General Grant met General Lee to arrange the terms of the latter's surrender. The first building, planned by Thomas Jefferson, was modeled upon the Maison Carrée at Nimes, France. The second is no longer standing.



This picture, after a painting by the artist Thomas Nast, shows General Grant sitting in front of his tent with plans and maps around him. It was not until the spring of 1864, after he had had great successes along the Mississippi and in Tennessee, that Grant was given the title of lieutenant-general and made commander-in-chief of the armies of the United States.

northward toward Columbia, which was burned. The people of the city and many others believed that it was set on fire by the soldiers, but General Sherman always denied this.

SHERIDAN AND EARLY IN THE SHENANDOAH VALLEY

Now we shall leave Sherman's army for a time and see what was going on elsewhere. Lee hoped that he could force Grant to send away some of his forces from Petersburg, by threatening to attack Washington. He therefore sent General Early to western Virginia with orders to make as great a show as possible. Early moved toward Washington, and at one time was in sight of the city. Grant sent General P. H. Sheridan to oppose Early. In several battles Early was defeated and driven out of the valley, and Sheridan then laid waste that rich region so that it was said "that if a crow wished to fly down it, he must carry his provisions with him."

THE NET CLOSES ABOUT LEE'S ARMY

Meanwhile the net was closing around Lee's army. Grant had two men to his one; Sherman was steadily approaching from the South, and then, besides, Lee's soldiers lacked food and clothing. It was plain that Richmond could not be protected any longer. The only hope lay in joining Johnston, who had again been put in charge of the forces which had been shattered by Sherman and Thomas. If this could be done, Lee intended to retreat farther south, and continue the contest.

The first attempt was made March 25, but though at first successful, the Union lines were too strong, and Grant moved a heavy body of troops to cut off a retreat. A week later Sheridan broke Lee's line at Five Forks, and captured 5,000 prisoners. The next day (April 2) Petersburg was attacked but could not be taken. That night Lee withdrew his men from Petersburg and Richmond. At Amelia Court House he found that a train load of supplies which he had ordered to remain there had by mistake been sent on to Richmond. His army had nothing to eat.

The Union army pressed on in pursuit, and Sheridan hurried ahead to get in front. For four days the Confederate soldiers had had no food except perhaps a handful of corn, and at last, on April 8, Lee realized that nothing more could be done. On April 9, 1865, he and Grant met at the little village of Appomattox and arranged terms for the surrender of 27,000 men—all that were left.

Meanwhile Sherman had reached Goldsboro, North Carolina, and then moved on to Raleigh. Finally, April 26, Johnston surrendered near the spot where the city of Durham now stands, and soon after the other forces of the Confederacy also gave up the hopeless contest.

THE END OF THE CONFEDERACY IS AT HAND

Jefferson Davis, when Richmond was given up, hastened southward, hoping to organize resistance across the Mississippi, or to escape from the country. He was captured by Union cavalry, May 10, near Irwinsville, Georgia, and imprisoned in Fortress Monroe under charge of treason. After a time (1867), he was released on bail and was never brought to trial.

The news of Appomattox had hardly spread over the United States when the terrible tale of the assassination of President Lincoln by John Wilkes Booth, an actor, followed. This occurred in Ford's Theatre, in Washington, on the night of April 14, and the same night an attempt to kill William H. Seward, Secretary of State, was also made. It was thought at first that some of the Confederate leaders had had a part in the plot, but it was discovered that it was a mistake. Booth escaped, but was finally discovered and shot while resisting arrest.

After the surrenders of Lee and Johnston the Confederate soldiers made their way to their homes to try to make a living for themselves and their families. In many cases they found their houses and barns burned, their cattle and horses gone, the towns in ruins, the railroads and the bridges destroyed, and the few factories useless. Many men who had been wealthy before the war were reduced to poverty, and found it hard to get employment, as their neighbors were as poor as themselves. The outlook for the future seemed very dark. Many of the negroes thought that freedom meant that they would not have to work, and flocked to the towns, where they expected to be taken care of. Many believed that the government would give every one of them "forty acres and a mule."

AS AN ARTIST SAW CAMP LIFE

Winslow Homer, as a young artist with the Army of the Potomac, made sketches which he later developed into paintings. These views are taken from two of them. The upper one, A Rainy Day in Camp, shows a cavalry encampment in a steamy rain—a group of cavalrymen around a fire, a long line of patient horses before a row of tents, and a wretched-looking army mule rebelling against the woes of camp life.

This group shows a young general, Francis C. Barlow, receiving the surrender of three prisoners brought from the front under the escort of a private. Its story is so simply told that no comment is needed. Photos, courtesy the Metropolitan Museum of Art.

WHAT WAS TO BE DONE WITH THE SECEDING STATES

The first question to come up was what was to be done with the seceding states. The Thirteenth Amendment to the Constitution forbidding slavery anywhere under the United States flag had passed Congress before the end of the war and in December, 1865, became a part of the Constitution. That much was settled.

Now the North had said all the time that a state could not secede. If this were true, then these states had the right to choose their rulers, vote for President, and send Senators and Representatives to Congress, for they had never been out of the Union. Yet it was thought to be dangerous to give them this power, as it was feared that they would ill-treat the negroes, pay the Confederate debt, and undo the results of the war. So several other theories about the seceding states were advanced. One was that the states had committed suicide and so had become territories again. Another said that they were conquered provinces and that Congress might treat them as it would foreign territory. The fourth idea was that they were still states but had forfeited their rights.

WHAT THE TERM RECONSTRUCTION MEANT

Andrew Johnson, who had succeeded President Lincoln, at once attempted to admit the seceded states into the Union as fast as they formed new governments. Congress would not allow this, except in the case of Tennessee. During the war a part of Virginia had been set off as the state of West Virginia. At first the South was formed into five military districts, and an army officer was placed over each of them. Each state was required to make a new constitution, giving the negroes the right to vote, and to ratify the Thirteenth and Fourteenth Amendments. This was called Reconstruction. When this was done they were readmitted to the Union. Some of the states were not recognized as members of the Union until 1870. Many white men were not allowed to vote, though every ignorant negro was given the privilege. As a result, the state officers were very often negroes or Northern white men. Some of these Northern men had gone South expecting to spend their lives there, but a much greater number were greedy adventurers who cared only for their own pockets. They were commonly called "carpetbaggers," and they promised the negroes that the property of the whites would be divided among the former slaves if they would vote for them.

As a result, the government of the states was very corrupt and wasteful. Taxes were so high that the owners of land could not pay them. There was much disorder, since the former slaves did not know how to use their power, and a secret society, the Ku Klux Klan, was organized among the whites. The members rode about the country at night in disguise, and whipped and even killed some of the leading carpetbaggers and negroes.

At last the Southern white people got possession of the state governments one by one, sometimes fairly, sometimes by force or by fraud, but the memory of the "Reconstruction Days" still lives, and this is the chief reason why the South has in so many things opposed the North since the war. The anger and the bitterness caused by the war might have been forgotten, but Reconstruction was worse than war.

PRESIDENT JOHNSON IS FINALLY IMPEACHED

President Johnson was not liked by the Republican members of Congress, who tried to take all his power away from him, and he in turn opposed Congress in every way he could. At last the quarrel grew so bitter that he was impeached in 1868. According to the Constitution the Senators are the judges when a high officer of the government is tried on the charge of abusing his power. When the vote was taken, thirty-five Senators voted guilty and nineteen not guilty. The Constitution says that to find a man guilty two-thirds must vote against him. So, you see, if one man had changed his vote, President Johnson would have lost his office.

TWO SIDES OF THE GREAT CONTEST

In one way we may be proud of the war, no matter whether we live in the North or in the South. No soldiers ever showed greater bravery than was exhibited in many of the 2,400 battles of the war. While there was much that was cruel and hard, there were many bright spots, deeds of kindness and of heroism which will live forever.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 2669.

Photo, L. Frank. **Rolls of paper ready for the devouring printing-presses.**

PULP AND PAPER

CONTINUED FROM 2312

DO you ever wonder where all the paper comes from that you see so much of every day? The paper in this book and in all the other books in the house, the paper around the parcels that come from the shops, the paper in the magazines, and in the piles of newspapers that are gathered up and stowed away—a tremendous amount of paper! Now we are going to tell you how and from what this paper is made. As there is so much of it everywhere, there must be a large number of men engaged in many big mills, and a great deal of money spent in its manufacture.

To begin with, most paper nowadays is made from wood. You have already read about the immense forests suitable for making paper which are yet standing in Canada. On the other hand, the United States has used up much of its pulpwood, and must depend upon Canada for a large part of its supply of pulpwood, pulp and paper. About two-thirds of the newspaper used in the United States has its source in Canadian forests. Large amounts of pulp and paper are also sent to Europe and even to far-away Japan. Let us learn how pulp and paper are made in some of the great Canadian mills, which are situated chiefly in Ontario and Quebec.

Have you ever had a sliver in your finger? Perhaps you have picked a match stick to pieces, or in a moment of thoughtfulness chewed one. In any of these cases you will have noticed how finely the wood breaks up into small pieces almost like the hairs of a brush. Well, each of these tiny pieces of wood is really a bundle of very fine fibres, much finer than the finest thread, and they are bound or stuck together with the gum or resin which goes to make up the wood. You know what pine gum is if you have ever sat at the base of a pine or spruce tree and leaned back against the trunk.

If you will take an old newspaper and tear a piece of it without folding it, and then look closely at the torn edge, or, better still, look at it through a magnifying glass, you will see plenty of these tiny fibres sticking out, so it will not be hard to realize that the paper is just a mat of these fibres pressed out thin and smoothed down. And now the game is simply to find out how these fibres are separated from the blocks of wood, and from each other, and made first into a soft mushy pulp with water, and finally matted together again, but this time into thin sheets of clean white paper.

While all trees and woody material such as the stems of rushes and grasses contain fibres, some kinds of wood yield

more and better fibre, and yield it more easily than any others, and so these are used as "pulpwood." And the best of all the trees for this purpose is the spruce. White spruce is good, but black spruce is perhaps a little better, and there is a very great deal of black spruce in Canada. It grows away back in the forests on the rocky hills and around the muskegs, and some swampy places are so full of it they are called black-spruce swamps. You can always tell a black spruce when you see it by two signs. First, its branches slope downward from the trunk and make it look like a real Christmas tree, and, next, it tapers off to a very slender point. Someone has called Canada "The Land of the Pointed Firs," and I am sure you will notice these pointed firs in some of the pictures. The spruce is just one of a large family of trees known as fir, and is typical of all northern forests.

THE PULP AND PAPER MILLS OFTEN COMBINED

The Forest pictures show how the logs are cut in the forest and taken to the rivers and so floated down to the mills. The mills in this story, however, are not sawmills, but pulp and paper mills. Some mills make pulp in thick, heavy sheets, thicker than blankets, and sell this to other mills farther away from the wood supply to be made into paper; some make paper alone, but most of the mills in Canada to-day make and sell both pulp and paper.

On arriving at the mill the logs are lifted out of the water by the jack-ladder, or elevator, which slopes down under the water, picks up the logs, and carries them up sideways into the slasher, where a number of circular saws traveling at very high speed cut the logs up in a twinkling into pieces two feet long, called blocks. When the river freezes up in the autumn these jack-ladders get a rest, because the logs cannot float down in the winter when the river is covered with ice, and, besides, these machines cannot work through the ice. So they are busy all summer, and to keep the mill supplied with pulpwood during the winter months some of these two-foot pieces are piled up into an enormous pile near the mill. This is called the block pile and contains many thousands of cords of wood. The rest of the blocks go directly into the mill, but they do not all go to the same part, and we must now explain why.

TWO KINDS OF WOOD-PULP, MECHANICAL AND CHEMICAL

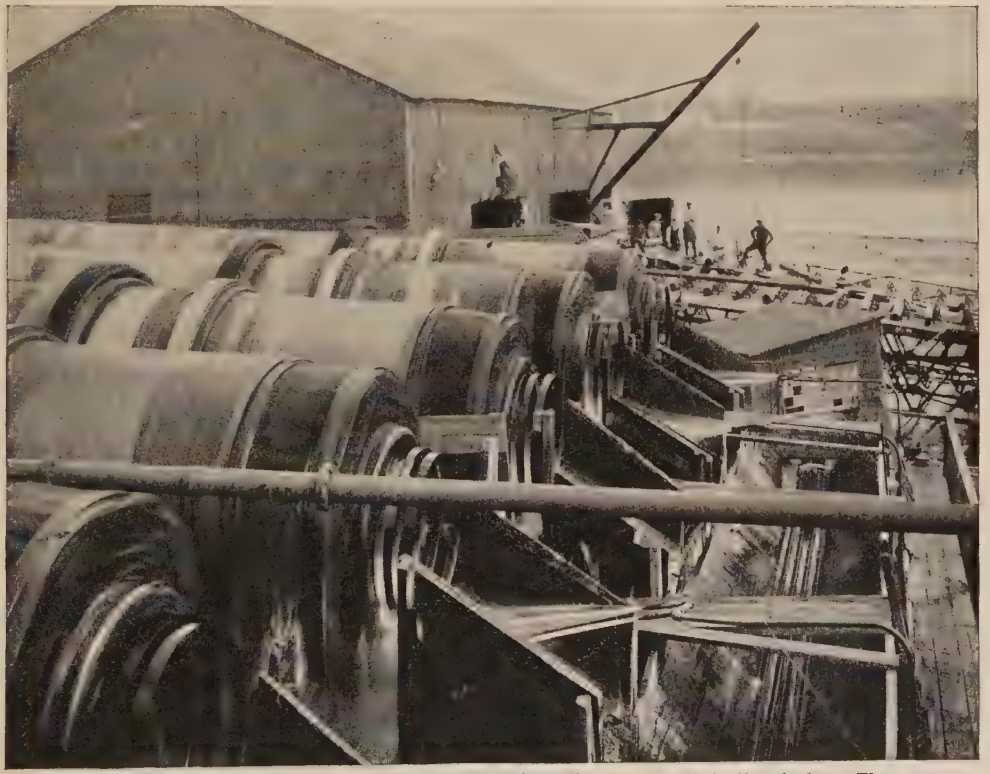
Let us suppose this mill we are visiting makes both pulp and paper. The paper produced here is for the newspapers and is called "newsprint." Of course we must all have our morning and evening papers every day, and our weekly papers with the comic supplements; and what trouble there would be if they stopped coming! So there is great hurry and bustle at the mills to keep the supply of paper quite regular for the printer. Everything seems to be moving more and more rapidly these days, and the paper-makers have had to find a quick way of making pulp from wood. The fastest and cheapest way of making it is by grinding the wood. So let us follow a block from the slasher into the mill. Poor old blocks of wood! They have had a busy time since they left their quiet stands in the forest, but the worst is yet to come.

Conveyors take the blocks first to the barkers, where they are tumbled about inside big revolving drums of steel that lie on their sides; when the wood has come through these the bark is all off, and as they emerge they are met by a stream of water which washes them clean. Next, conveyors take some of them to the grinding-room. Here the wood is ground by huge stones like grindstones, only much bigger, and turning ever so fast. The logs are pressed against the stones by machinery and a stream of water is played over them steadily to keep them cool and to wash away the ground wood as fast as it is formed. If the grinding is done properly, the fibres are separated from each other and form a soft pulpy material called "ground wood" or "mechanical pulp." The part of the mill where this process goes on is known as the ground-wood department. Unfortunately, however, this grinding cuts up the fibres, and they are so short that they will not, by themselves, make a good sheet of paper. They must be mixed with a pulp consisting of longer and stronger fibres which will help to hold the little fellows together and so make a strong sheet. These long strong fibres are made by a different process, and because chemicals, and chemical processes are used in the manufacture of this kind, it is called "chemical pulp." So here we have the two kinds of pulp, ground-wood and chemical.

FROM BOOM TO SLASHER AND BARKER

Photo, Board of Trade, Fort William.

A boom of logs at the mouth of the Mission River on Lake Superior. They will be towed to the mills of the Fort William Paper Company by tugs.



In the background is the jack-ladder carrying the logs from the water up into the slasher. The saws are in the shed. The big drums are the barkers. The clean logs tumble out from the end into a trough and are carried either to the block pile or to the mill.

Photo, Laurentide Pulp and Paper Mills.

WHAT GOES ON IN THE CHEMICAL-PULP PROCESS

Now how do you suppose chemical pulp is made? Let us follow from the barkers those blocks that did not pass through the grinders, and perhaps we shall find out. The long conveyors, which are just troughs with moving cables in the bottoms, carry these to a different machine called the chipper. This consists of a big flat steel wheel with knives set in the side of it, and as it whirls around, these knives take pieces out of the log, and in no time the whole block has been cut up into chips about the size of your two thumb nails. The chips are hurried away by other conveyors to the highest point in the paper mills, except the top of the chimney, the chip bin. These bins, which hold a good many cords of chips, are situated immediately above other large steel tanks called digesters. When a digester is ready to be filled, a round steel cover on top of it is opened and chips are poured into it from above. Then the liquor containing the chemicals is poured in through pipes from other tanks, the cover is clamped on tightly and steam is turned into the digester under great pressure, and the chips are cooked in this hot liquid for a number of hours.

The chemical used in making this pulp is acid calcium sulphite, and so it is also known as "sulphite" pulp. How do you think it differs from ground-wood pulp? Well, the hot sulphite liquor does two things. First, it dissolves all the resin and gummy material that binds the fibres together, so that they fall apart easily. These fibres are long, just as long as the chips from which they are liberated, not little short pieces like the ground-wood fibre. In the next place, the sulphite bleaches the fibre, so that it is much whiter than the ground wood, which is just the creamy yellow color of wood. It does not bleach enough, however, to make good white paper, and so further bleaching is necessary in the case of both kinds of pulp before it is quite ready to go into the sheet of paper.

THE CHIPS REDUCED TO PULP HAVE NOW TO BE SCREENED

After the process of cooking has gone on until the chemicals have penetrated to the centre of even the thickest chips, the gummy and resinous matter is all dissolved, and the chips are soft and pulpy and will fall to pieces if touched. The digester is now "blown"—that is, the pressure is released—and the pulp emptied out at the bottom. The gases from the hot liquid have a peculiar, fragrant smell like roasted nuts, and when the digester is blown, this smell fills the air, and can be noticed often a mile from the mill when the wind is in the right quarter. If you are too near it, however, or in the digester house itself, the smell is not so nice. It is the same odor that used to come from the old-fashioned sulphur matches, and is due to sulphur dioxid from the sulphite liquor. It makes you cough. All the material is discharged into a pit called the blow-pit.

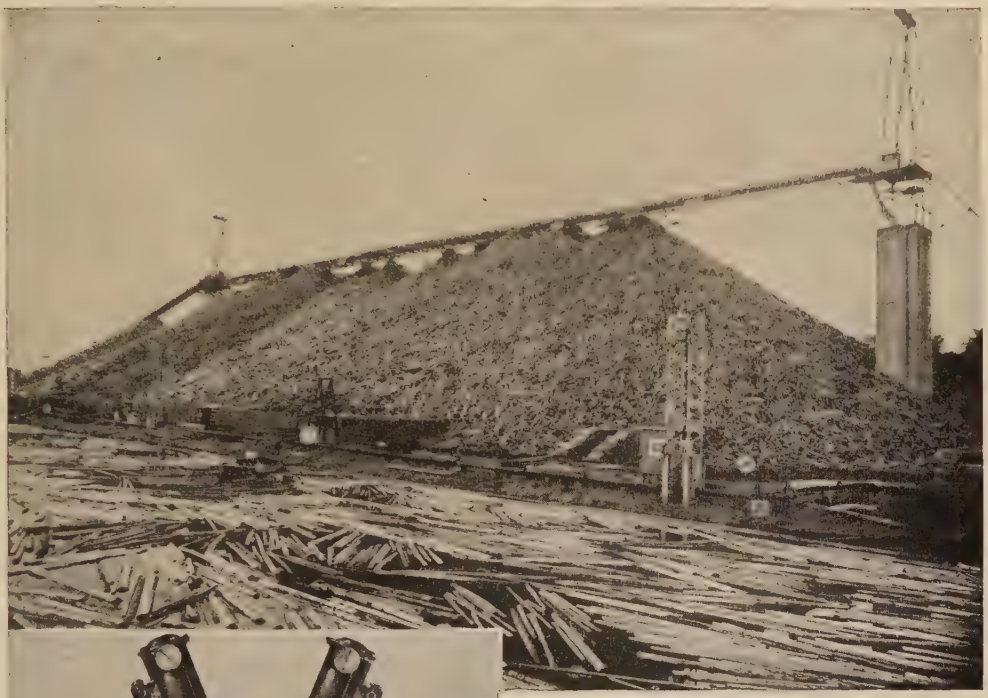
Here the fibres are partly loosened by the force with which the stream of pulp falls into the pit. At last the wood has become pulp, but it is not yet quite ready to be made into paper. The knots and hard pieces of wood have not been affected by the cooking, and now these must be screened out, allowing only that material consisting of the pure separated fibre to go on to the paper machine. Ground-wood pulp must also be screened to remove slivers and large pieces which broke from the wood without being properly ground.

After the chemical pulp has been carefully screened it is also washed to free it from the sulphite. It is picked up on rotating drums covered with wire screens which drain off the liquor but hold back the fibre. And in this machine, also, most of the water is sucked out by air suction. Then it is thoroughly mixed with more water to wash it, and again "thickened" on other drums, and it then goes to the bleaching vats, for it is still not quite white enough for paper. The ground-wood pulp must also be bleached, for it is even yellower.

THE BLEACHING PROCESS MAKES THE PULP READY FOR THE BEATERS

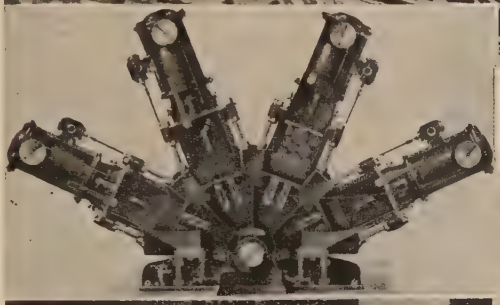
Have you ever noticed how old newspapers lying in the sun turn yellow? And you have surely observed how a new board fence gradually turns darker yellow and finally brown. This is the same process, but newspapers would hardly become as dark as the fence-wood, for most of the material in them which will change color has been removed or changed by the bleaching. Ordinary bleaching-powder solution is used. It is mixed with the pulp. The mixture is allowed to lie in bleaching vats until the pulp has become

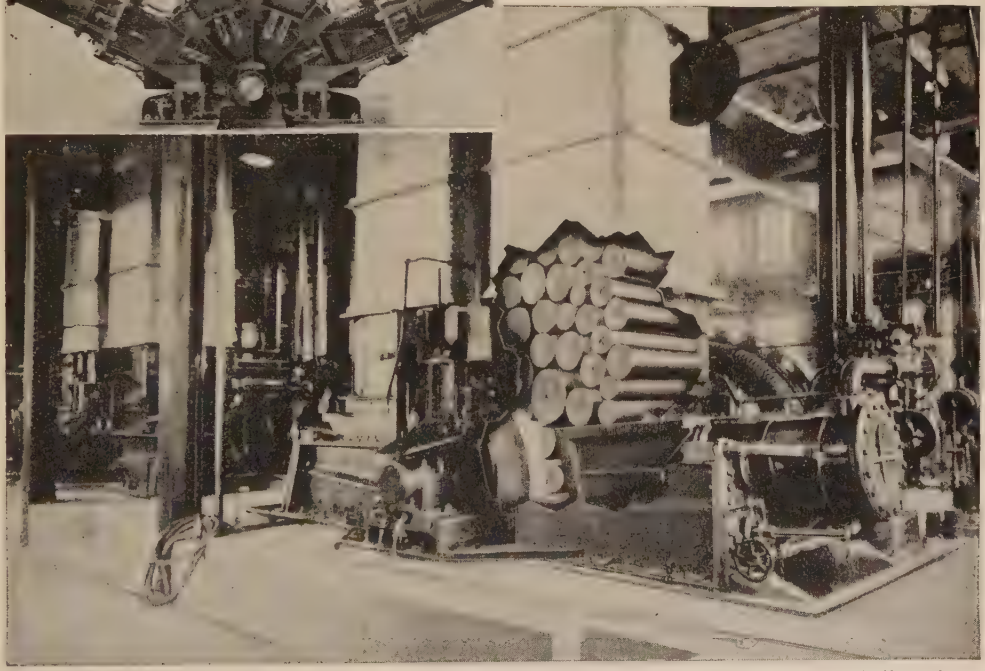
THE BLOCK PILE AND PULP-GRINDERS



Photo, Canadian National Railway.

In order to keep the plants running during the winter when the rivers are frozen, huge stores of logs are built up during the summer months.





A later type of pulp-grinder with part of it cut away to show the logs inside and the grinding stone. Inset, an older type of grinder driven by water power. Four pockets contain the wood.

sufficiently white, when it is again subjected to the same process of washing and thickening, and is finally ready for the beaters.

A number of important things go on in the beaters. First of all, it is here that the two kinds of pulp come together again. You can easily see that chemical pulp is more expensive than ground-wood pulp on account of all the processes it has to go through. It is slower to make, the chemicals cost money, and there is much more expensive machinery needed. So just enough chemical pulp is mixed with the mechanical to make the paper sufficiently strong for newsprint. Of course the more long fibres there are, the stronger the paper. Some wrapping-papers are very strong, and consist altogether of long-fibre pulp made by a different process, called the sulphate process. This sulphate pulp is not bleached, and so wrapping-paper is not white. Newsprint is not as strong as wrapping-paper, yet strong enough to go through the printing-presses without tearing, and it contains only ten per cent of the long-fibre pulp and ninety per cent of ground-wood. They are mixed in these proportions in the beaters.

Here, also, a little bit of bluing is added. You know how the washerwoman puts bluing in the water to make the clothes look snow-white when they are finally dried. Another thing added in the beaters is called "size." This is simply some material like very fine clay and a very little glue to give the paper a smooth surface. Not much size is used in making newsprint, but for some of the very smooth papers in magazines much size is used. The more size, the smoother and glossier the paper becomes when it is finished. The material is also known as "filler," and the process as "sizing." Here, also, any dyes or coloring matter may be added if a colored paper is desired, but nearly all newsprint is white.

Perhaps the most important thing that happens in the beaters, however, is the smoothing-out and separating of every little last bundle of fibres, and the combining of these in some way with water, a process which the chemist calls "hydration." This makes the fibre very much stronger, and the longer the pulp stays in the beater, the stronger it becomes. However, it cannot stay there always, or we should have no newspaper one of these mornings; so it moves along on the last stage of its journey as pulp, toward the paper machine.

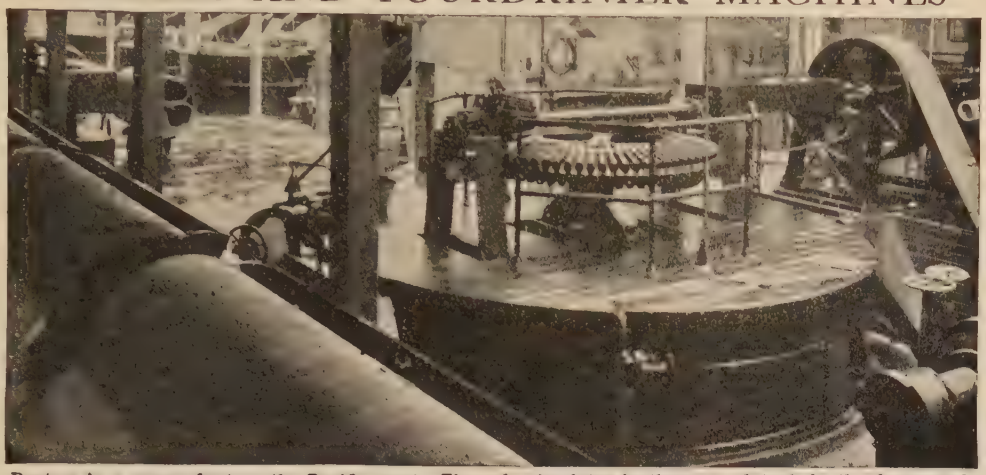
THE PAPER MACHINE IS THE BIGGEST IN THE MILL

Have you ever seen a paper machine? Well, if not, when you do, you will agree that it is the biggest and most wonderful machine in the entire paper mill. Out of this machine a sheet of paper almost twenty feet wide comes at the rate of a mile every five minutes. Just think of a sheet of paper twenty feet wide and over two hundred and fifty miles long—more than enough to reach from Toronto to Detroit—coming out of this machine every day! Of course we must remember that the machine doesn't stop at night. It goes night and day; and we are speaking of the very biggest machines that are made now. They are not all so large, nor does the paper run through all of them so fast, but the typical modern paper machines installed in the big paper mills are both large and fast. Like themselves, their name is long—Fourdrinier.

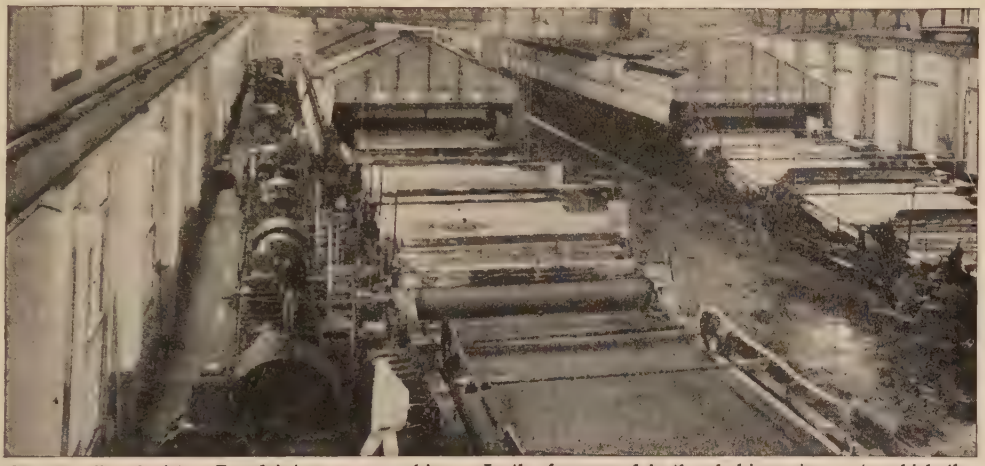
THE BRASS-WIRE SCREEN AND THE BIG ROLLS

But we are getting ahead of our story. Some day you must see one of these machines at work, and then you will understand about them so much better. First of all, the thin pulp from the beaters flows down on to a long brass-wire screen, which is really an enormous belt as wide as the sheet of paper is going to be and moving just as fast as it is. Did we not say this sheet traveled a thousand feet a minute? The whole screen has a shaking, jigging motion which spreads the fibres evenly over the surface of the wire and arranges them as they are going to lie when the sheet is finished. Most of the water drains through the wire at this point, and the fibres become more and more matted together. Then the wire runs over a suction box, and most of the remaining water is sucked out. The moist fibre, now for the first time beginning to resemble a sheet of paper, leaves the wire, and literally shoots on to a blanket belt which carries it round and round ever so many big rolls. Some of these squeeze the fibre together and remove more water; others, heated by steam, drive the last of the moisture out of the sheet; and others give the paper a final smoothing and a burnish. Now it is ready to leave the machine.

BEATERS AND FOURDRINIER MACHINES



Beaters in a paper plant on the Pacific coast. The pulp circulates in the covered tank in the foreground. Blades inside are turned by the gear on top, which is driven by an electric motor.



The "wet" end of two Fourdrinier paper machines. In the foreground is the shaking wire on to which the pulp flows. The right-hand machine shows the blanket which takes the pulp sheet from the wire.

The "dry" end of the same machines. The sheet of paper coming from the machine is being rolled into a huge roll, and the chains will carry it to the finishing-room. Photos, L. Frank.

Photo, L. Frank.

The plant of the Powell River Paper Company at Powell River, British Columbia.

As soon as a roll is filled it is carried by overhead trolleys into the finishing-room, where it is cut into lengths to suit the purchasers. Small rolls for the small-town papers; big rolls for the city papers. Then the rolls are carefully weighed, wrapped up and sealed, to keep them clean until they reach their destination. They bid farewell to the paper mill, and away they go by the trainload to the thousands of newspapers.

Now we have followed the trees from the time they were felled far away in the forest, made into logs and floated down the rivers to the mills, cut into blocks and chipped and ground, and washed, screened, and bleached and beaten, to emerge finally as a huge sheet of snow-white paper which is put to so many, many uses every day. It will be good for us if, when we pick up a paper, we occasionally close our eyes and think of it as having been once part of a tall, stately tree standing in the forest.

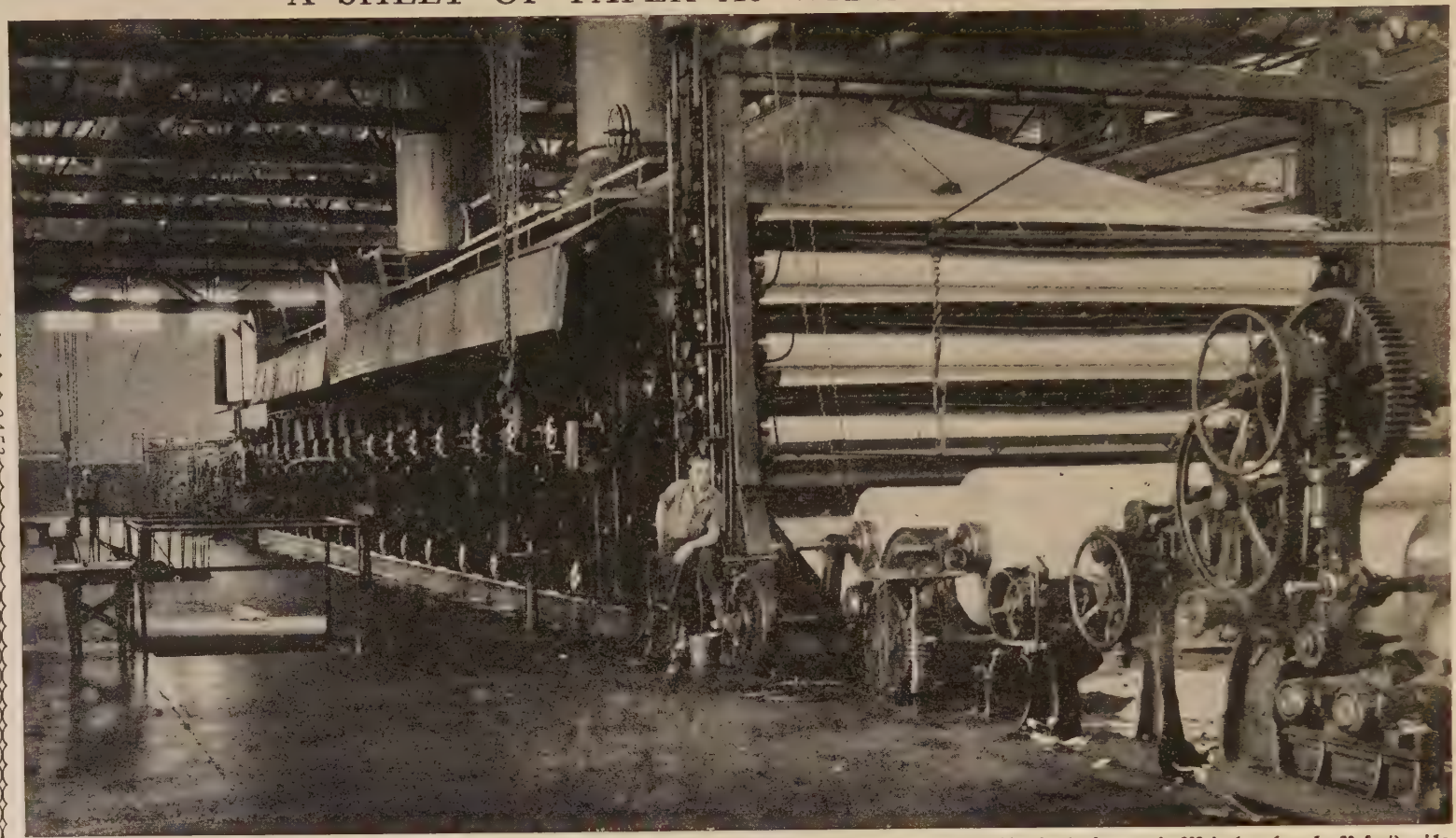
And if we listen closely we shall hear the wind sighing in the spruces. Or perhaps it is the tree sighing at what the wind, which has come from far away and seen many things, tells it of what is in store for it. The birds sing to our tree. The deer and the moose and the bear pass beneath it. It hears the river rushing along near by, or perhaps the trout leaping in a quiet pool. It must be very happy, for it is so strong and graceful and has lived so long in its forest solitude. You see, a tree is not ready to be made into paper until it has lived a hundred years.

Don't you think we should be grateful to the trees and think kindly of the forests? And when we grow up should we not do all we can to protect them from careless and wasteful woodsmen and from their greatest enemy—fire? I am sure that when we really get to know the forest we shall love it.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 2543.

The mill of the Abitibi Power and Paper Company, Iroquois Falls, Ontario, showing from left to right the dam, the grinder and the mill. The capacity of this plant, probably the largest in the world, is 515 tons of newsprint and over 200 tons of pulp per day.

A SHEET OF PAPER AS WIDE AS A ROOM



This is a picture of one of the biggest machines in Canada at the plant of the Abitibi Pulp and Paper Company. This sheet of paper is 232 inches (nearly 20 feet) wide, and travels through the machine at the rate of over a thousand feet a minute.

Photo, Abitibi Pulp and Paper Company.

THE LITTLE GRAY BIRD IN THE BRANCHES

They went together to the wood where the nightingale used to sing, and half the court went with them. On and on they went till they reached the wood, and the little girl stopped before a tree. "There she is!" said she. "Listen, listen! There she sits!" And she pointed to a little gray bird up in the branches.

THE EMPEROR'S NIGHTINGALE

CONTINUED FROM 2352

THE palace of the Emperor of China was the most magnificent in the world. It was made entirely of fine porcelain, very costly but at the same time so brittle that it was dangerous even to touch it. The emperor's garden extended so far that even the gardener did not know the end of it.

Whoever walked beyond it, however, came to a beautiful wood with very high trees, and beyond that to a lake. The wood went down to the lake, which was very deep and blue; and among the trees dwelt a nightingale, who sang so sweetly that even the poor fisherman, who had so much else to do when he came out at nighttime to cast his nets, would stand still and listen to her song.

Travelers came from all parts of the world to the emperor's city. They admired the city, the palace and the garden, but if they heard the nightingale, they said: "This is best of all." And they talked about her after they went home, and learned men wrote most beautiful verses about the nightingale of the wood by the lake.

These books went round the world, and one of them at last reached the emperor.

"What is this?" he said. "The nightingale! I do not know it! Can there be such a bird in my garden without my having heard of it?"

So he called his gentleman usher. Now he was so grand a personage that no one of inferior rank might speak to him; and if anyone did venture to ask him a question, his only answer was "Pish!"

"There is said to be a very remarkable bird here, called the nightingale," said the emperor. "Her song, they say, is worth more than anything else in all my dominions. Why has no one ever told me of her?"

"I have never before heard her mentioned," said the gentleman usher. "She has never been presented at court."

"I wish her to come and sing before me this evening," said the emperor. "The whole world knows what I have and I do not know it myself!"

"I have never heard of her," said the usher, "but I will seek her."

But where was she to be found? The usher ran up one flight of steps, down another, through halls, and through corridors, hoping to find someone who knew about the bird. Not one of all whom he met had ever heard of the nightingale, and the usher returned to the emperor and said:

"It must certainly be an invention of the man who wrote the book."

"But the book in which I have read it," returned the emperor, "was sent me by the high and mighty Emperor of Japan, and therefore it

cannot be untrue. I wish to hear the nightingale; she must be here this evening, and if she does not come, the whole court shall be flogged."

"Tsing-pe!" exclaimed the gentleman usher; and again he ran upstairs, and downstairs, through halls and through corridors, and half the court ran with him; for no one relished the flogging.

At last they met a poor little girl in the kitchen, who said: "Oh, yes, I know her very well!"

"Little kitchen-maiden," said the gentleman usher, "I will procure for you a sure appointment in the kitchen if you will only conduct us to the nightingale."

So they went together to the wood where the nightingale used to sing, and half the court followed at their heels.

On and on they went till they reached the wood, and there the little girl stopped before a tree.

"There she is!" she said. "Listen, listen! There she sits!" And she pointed to a little gray bird up in the branches.

"How simple she looks!" said the gentleman usher.

"Little nightingale!" called out the kitchen-maid, "our gracious emperor wishes you to sing to him."

"With the greatest pleasure," replied the nightingale; and she sang in such a manner that it was delightful to hear her.

"Most excellent nightingale!" said the gentleman usher, "I have the honor to invite you to a court festival which is to take place this evening, at which his imperial majesty hopes to be enchanted with your delightful song."

"My song would sound far better among the green trees," said the nightingale. However, she followed willingly when she heard that the emperor wished it.

There was a general cleaning and polishing at the palace; the walls and the floors, which were all of porcelain, glittered with a thousand gold lamps; the loveliest flowers, with the merriest tinkling bells, were placed in the corridors; there was a running to and fro, which made all the bells ring, so that one could not hear one's own words.

In the midst of the great hall where the emperor sat, a golden perch was erected, on which the nightingale was to sit. The whole court was present, and the little kitchen-maid received permission to stand behind the door, for she had now actually the rank and title of "Maid of the Kitchen." All were dressed in their finest clothes, and all eyes were fixed upon the little gray bird, to whom the emperor nodded as a signal for her to begin.

The nightingale sang so sweetly that she touched the hearts of all who heard her, and the emperor was so delighted that he said: "The nightingale shall have my golden slippers and wear them around her neck."

But the nightingale said: "I have seen tears in the emperor's eyes. That is the greatest reward I can have."

Yes, indeed, the nightingale's success was complete. She was now to remain at court, and to have her own cage, and all the city began to talk of the wonderful bird.

One day a large parcel arrived for the emperor. On it was written "Nightingale."

"Here we have another book about our far-famed bird," said the emperor.

But it was not a book; it was a little piece of mechanism, lying in a box—an artificial nightingale, which was intended to look like the living one, but was covered with diamonds, rubies and sapphires. When this artificial bird had been wound up, it could sing one of the tunes that the real nightingale sang; and its tail, all glittering with silver and gold, went up and down all the time. A little band was fastened round its neck, on which was written: "The nightingale of the Emperor of China is poor compared with the nightingale of the Emperor of Japan."

"That is famous!" said everyone; and he who had brought the bird was given the title of "Chief Imperial Nightingale Bringer." "Now they shall sing together; we shall have a duet."

And so they sang together; but the song was not a success, for the real nightingale sang in her own way, and the artificial bird produced his tones by wheels.

"It is not his fault," said the artist; "he keeps exact time, and sings according to method."

The artificial bird then sang alone. He was quite as successful as the real nightingale. And then he was so much gayer to look at; his plumage sparkled with jewels, silver and gold. Three-and-thirty times he sang the same tune,

and yet he was not weary; and everyone would like to have heard him again. However, the emperor now wished to hear the real nightingale sing. But where was she? She was gone and no one had seen her as she flew, out of the open window, back to her own green wood.

"What is the meaning of this?" said the emperor; and all the courtiers abused the nightingale, and called her a most ungrateful creature. "We have the best bird, at all events," they said. And for the four-and-thirtieth time they heard the same tune; but still they did not quite know it, because it was so difficult.

The real nightingale was banished from the empire; but the artificial bird had its place on a silken cushion, close to the emperor's bed. All the presents he received, gold and precious stones, lay around him; he was given the rank and title of "High Imperial Dessert Singer."

Thus it went on for a whole year. The emperor, the court and all the Chinese knew every note of the artificial bird's song by heart; but that was the very reason why they enjoyed it so much—they could now sing with him.

But one evening, when the bird was in full voice and the emperor lay in bed listening, there was suddenly a noise, "bang!" inside the bird; something sprang, "sur-r-r-r!" Then all the wheels were running about, and the music stopped.

The emperor sprang quickly out of bed and had his chief physician called. But what could he do? Then a clockmaker was fetched, and at last, after a great deal of consultation, the bird was in some measure put to rights again; but the clockmaker said he must be spared much singing, for the pegs were almost worn out, and it was impossible to renew them. There was great lamentation, for now the artificial bird was allowed to sing only once a year.

When five years had passed away, a great affliction came upon the empire. The emperor was ill, and it was reported that he could not live.

Cold and pale he lay in his magnificent bed. The floors of all the corridors were covered with cloth, in order that not a step should be heard; and everywhere it was so still—so very still. But the emperor was not yet dead, though he lay stiff and pale in his splendid bed, with the long velvet curtains and heavy gold tassels. Death sat at his bedside, and the emperor was afraid. Through an open window the moon shone dazzlingly down on the emperor and his artificial bird.

"Music, music!" cried the sick man. "Thou dear little artificial bird, sing, I pray thee, sing! I have given thee gold and precious stones; I have even hung my golden slippers round thy neck! Sing, I pray thee, sing!"

But the bird was silent; there was no one there to wind him up, and so he could not sing. Death continued to stare at the emperor with his great hollow eyes; and everywhere it was still—so very still.

All at once the sweetest song was heard, and the room was filled with such beautiful sounds that Death could not stay. The music of the real living nightingale had conquered Death, who, like a cold white shadow, flew out at the window.

At his going the sick man stirred, and a faint color began to flush his thin cheeks. Natural noises could be heard again, and the unearthly stillness no longer made itself felt. Then a weak voice was heard in the royal chamber.

"Thanks, thanks!" said the emperor. "Thou heavenly little bird, I know thee well. I have banished thee from my realm, and in return thou hast brought me back to life. How shall I reward thee?"

"Thou hast already rewarded me," said the nightingale. "I have seen tears in thine eyes, as when I sang to thee for the first time. Those I shall never forget; they are jewels which bring much cheer to a minstrel's heart. But sleep now, and wake strong and well. I will sing thee to sleep."

So she sang, and the emperor fell into a sweet sleep. Oh, how soft and kindly was that sleep!

When all the people knew that their emperor was whole again, their joy knew no bounds, and the little nightingale became the most popular person in the land.

The emperor begged her to stay with him and live in the palace, but to this she would not consent.

"I must be free," she said. "But in the evening, when you are alone, I shall come and sit in a tree by your window and from there sing to you of the good and evil in the world, and fill your mind with beautiful, helpful thoughts."

PRINCESS FLORINA

PRINCESS FLORINA was so beautiful that, when King Charming saw her portrait, he fell in love with her, and came with his minister to ask her hand in marriage. Unhappily, Princess Florina had a wicked stepmother and an ugly stepsister, who was called Troutina because her face was spotted like a trout's skin. When King Charming arrived, the stepmother took him to Troutina, whom she had arrayed in the richest robes and the loveliest gems which she possessed.

"But where is Princess Florina?" said the king, frowning. He saw her sitting in a corner, dressed in cotton, and hastened to her and said, with a tender smile:

"Princess, you do well to dress plainly. Beauty such as yours needs no adornment."

"Don't waste compliments on Florina," said the stepmother. "She is a very plain girl. Dear Troutina is waiting for you."

The king, however, stayed beside Florina, and talked with her for three hours, and spoke so sweetly that he won her heart.

But when he came next morning he could not find her. The stepmother had shut her up in a high tower. King Charming then resolved on desperate measures. He bribed a maid to show him the window of the chamber in the tower where the princess was imprisoned, and he came at night with a carriage and a long ladder, and climbed up to the window. A veiled girl appeared, and he lifted her down and put her in the carriage and drove off with her.

"Take me to the lodge in the forest," she said. "My godmother lives there, and she will help me."

They reached the lodge, and a dwarf opened the door, and showed the king and the veiled girl into separate rooms. The wall between the rooms, however, was very thin, and the king heard two voices speaking, and so he listened.

"How did you manage it?" said the first voice.

"Oh," said the second voice, "a maid told me that the king had bribed her to show him where Florina was imprisoned! So I moved the princess into the garret, and went into her chamber and veiled myself, and King Charming came and carried me off in her stead. Having eloped with me, he cannot now refuse to marry me."

"But I do refuse!" cried the king, striding into the next room, where he found Troutina talking with a witch.

"Wait!" said the witch. "You have not yet been asked to marry my goddaughter. I will teach you first to esteem her, and when she deigns at last to offer you her hand, you will not refuse it."

Striking the king thrice with her wand, the witch danced around him, and sang:

He who flirts and flies away
Shall have wings to carry him!
Shrike and hawk and shrieking jay
Hunt him down and harry him!
Till the maid he slights to-day
Condescends to marry him.

King Charming at once changed into a blue bird, and flew out of the witch's lodge into the forest.

The next morning, when Princess Florina opened her window, a blue bird flew down with an emerald ring in its beak, and put the ring on the window-sill, and then perched there and sang to her so sweetly that she said:

"Charming! Charming!"

"Ah, you still know me!" said the blue bird. "Yes, dearest, I am King Charming. I have been changed into a bird because I would not marry vile Troutina."

"And I have been imprisoned because you are in love with me," said the princess. "But never mind. We can now see each other more often than we could before."

"Put this ring on your finger," said the blue bird. "I flew into my rooms early this morning to get it for you. It is an engagement-ring."

The princess kissed the blue bird very tenderly, and put on the ring.

"Now," said the blue bird, "I will return and fetch a bracelet I had made for you."

But Troutina had seen the blue bird enter Princess Florina's chamber, and she had obtained a fierce hawk, which she flew at the blue bird as it came out of the window. Happily, King Charming's minister, who had been searching everywhere for his master, chanced to be passing, and he picked up the poor blue bird as it fell wounded to the ground.

Being a wizard as well as a minister, he was not at all astonished when the

blue bird spoke to him and said that it was the king. On learning all that had happened, he took the blue bird to the witch, and promised that King Charming would marry Troutina in a week's time, if he were at once healed and restored to his own shape. With three strokes of her wand the witch undid the spell.

"Even if I did not love Florina, nothing would induce me to marry Troutina!"

When she reached the palace the people had assembled to see the wedding procession and, owing to a strange commotion inside, she was able to enter unperceived. On reaching the great hall, she saw two pigs rushing about, and the witch, very much excited, running after them.

"It's no use," the king's minister was saying to the witch. "There is another

THE WITCH RAN AFTER TROUTINA AND HER MOTHER, WHO HAD TURNED INTO PIGS

Charming told his minister as they returned to the palace.

"Keep the witch quiet by preparing for the wedding," said the minister to the king, "and I will find another wizard, and the two of us working together will outwit her."

Troutina and her mother now set out for King Charming's palace, where the marriage was to take place, and Princess Florina, escaped from her tower, followed them, saying sadly to herself: "I must see him and return the ring."

wizard here besides me. Troutina and her mother have been turned into pigs, and pigs they shall remain."

"On with the wedding procession!" cried King Charming, catching sight of Princess Florina. "The real bride has come." And, kissing Florina, he led her to the royal carriage, and as they drove to the cathedral all the people shouted "Hurrah!" and danced and sang with glee, because the king was going to marry the beautiful princess whom he loved so much.

SIR TRISTRAM OF LYONNESSE

A STORY OF KING ARTHUR'S TABLE ROUND

TRISTRAM was a king's son, and dwelt at Lyonnesse. He was famous at his father's court for his beauty, his courage, and his skill at music. But his stepmother hated him out of her jealousy, and the king sent Tristram to the court of his brother, King Mark of Cornwall, so that she should do him no injury.

Now, in Cornwall Tristram found King Mark and all his knights in a state of fear. They had refused to pay tribute to King Anguish of Ireland, and a terrible knight, Sir Marhaus, had arrived with ships, and now lay off the coast challenging the bravest of Mark's knights to meet him in battle. None durst fight the great Irishman, and Mark bit his lips with rage. Then the beautiful Tristram of Lyonnesse said: "Make me a knight, and I will fight Sir Marhaus."

So Mark made him a knight, and the strong youth, henceforth to be famous throughout Christendom as Sir Tristram of Lyonnesse, went out to encounter Sir Marhaus. They met on an island, and when Sir Marhaus saw how young was this knight, he courteously bade him think twice before meeting death so early.

But Tristram answered boldly, and their horses clashed together. Long was the fight. Both men were dashed from the saddle, and fought fiercely on foot. The lance of Sir Marhaus pierced the side of Tristram, and his blood flowed like a river; but bravely the boy fought on, and at last, raising his sword, he brought it down on the head of Sir Marhaus so that it crashed through the skull.

Thus Tristram won his first fight. But his wound was sore, and it was said that to heal it he must needs go to the land of him who had dealt the blow; so Tristram passed to Ireland. Now, as he lay off the coast of that country, he sat upon deck playing the harp, and the music reached one who ran to King Anguish with news of it, and King Anguish sent for Tristram. Tristram, who had slain Sir Marhaus, brother of the Irish queen, called himself Sir Tramtrist, and was welcomed by the king, the queen and their daughter, the fair Isolt. To Isolt Tristram taught music, and she tended his wounds, and they were like brother and sister together.

THE GOOD SIR TRISTRAM DISCOVERS HIMSELF TO KING ANGUISH

Now, at the court was a Saracen of enormous strength, by name Sir Palamides, who, although a heathen, did yet overthrow the knights of Christendom, and was proud and haughty and disdainful in his bearing. This man teased Isolt with protestations of love, and would not take the maid's "Nay," but must always

declare that before long she would love him.

So, one day, being at a tournament, for Isolt's sake Tristram met this boaster. Wearing white armor and riding upon a white horse, he crashed against Sir Palamides, who was clad in black armor and mounted on a black horse; and with his lance Tristram drove the Saracen over his horse's tail, and only spared his life on condition that never again would he trouble the fair Isolt.

Then Tristram returned to Cornwall; but his uncle, who sought a wife, sent him to Ireland to bring back the fair Isolt, that she might be Queen of Cornwall. Now, on the way back to Cornwall with Isolt, as he lay at her feet on the ship's deck harping, Tristram grew thirsty, and seeing near him a flask, he gave it first to Isolt to drink, and then himself drank. Now, this was a love potion made by Isolt's nurse for Mark and Isolt only; for those who drank of this magic wine loved each other forever after. And so it came to pass that when Tristram looked next upon Isolt, and Isolt looked upon Tristram, they loved each other with a great love, and they were afraid.

Sir Tristram gave Isolt to King Mark, and then rode away and became a knight of the Round Table. And it came to pass that one day as Isolt walked in the forest, the Saracen suddenly appeared, and by guile carried her off. But as they rode through the forest a knight challenged Sir Palamides, and while these two fought, Isolt crept away into the glades of the deep forest, and presently was found by one who carried her to his castle in all honor. Then came the furious Sir Palamides to the castle, and sat down before it like one mad.

But Tristram, who had heard of Isolt's danger, rode up before the castle, very terrible and calm, and gave battle to Sir Palamides. The din of their fighting reached Isolt, and she looked from the window; and when she saw the Saracen stretched upon the green grass and Sir Tristram standing over him with lifted sword, she cried to him to spare. And at the sound of her voice Tristram grew pale and shook exceedingly, for he loved her dearly. But, on condition that Sir Palamides became a Christian and joined the brotherhood of King Arthur, he spared him, and Sir Palamides lived to be a very gentle and honorable Knight of the Round Table.

Then Sir Tristram carried Isolt to King Mark, and tarried long at the court of Cornwall. But King Mark hated Tristram; and one day, as Sir Tristram harped to Isolt, Mark sprang from a hiding-place and clove Sir Tristram through the skull. But the death of Tristram broke the heart of the fair Isolt, and she faded away and died.

THE BRAVE SIR TRISTRAM OF LYONNESSE, WHO DEFEATED THE SARACEN KNIGHT

This photograph and that on page 2460 are by Messrs. Ellis and Walery.

THE NEXT STORIES ARE ON PAGE 2597.

CATTLE DRINKING, NEW SOUTH WALES

Australia is mainly pastoral and the products of her flocks and herds make up the principal wealth of the country. Within a line north from Melbourne to Cooktown and eastward to the Dividing Range, practically all the land is natural sheep pasture with the right climate and vegetation for growing wool of the highest quality; wool is by far the most valuable export. There are similar tracts in the south and west.

A quay in the famous natural harbor of Sydney, the capital of New South Wales.

AUSTRALIA, THE GREAT SOUTH LAND

CONTINUED FROM 2304

TO visit Australia, which is the only continent wholly inhabited by a single people, we must travel part round the globe, for this part of the British Empire is very far away from our own land, almost, in fact, on the other side of the great earth-ball on which we live.

When we who live in the northern hemisphere are fast asleep at night, the Australians are in the midst of their brilliant day. When we are keeping Christmas in midwinter with frost and snow, the Australians are keeping it in midsummer, with a festival of bright flowers and hot sunshine. When they look up to the beautiful night-sky over their heads, they see quite different stars from those we know so well in our northern half of the world—the Pole Star and those of the Plough. It is the stars of the Southern Cross that flame so brightly over the land that has taken them for her emblem.

What a huge, solid mass of land Australia looks on the map! Sometimes it is called the largest island in the world; sometimes the smallest continent. It is twenty-five times as large as the British Isles and almost as large as all Europe. Let us see how it has come to pass that the Union Jack, together with the stars of the brilliant Southern Cross, floats over the whole of this vast territory.

We must go back to the times of the Stuarts for our first glimpse of it. A Spanish sailor, Torres, seems to have been one of the first explorers, and he left his name in the straits between the north of Australia and the island of New Guinea. The Dutch came next with many expeditions all through the seventeenth century, and for 150 years what was known of the island-continent was called New Holland. But neither Spaniards nor Dutch made colonies in the lands they found in this part of the world. Tasman, the explorer after whom Tasmania is named, did not even land in Tasmania, the island nearly as large as Scotland, that lies about 200 miles south of Australia.

About fifty years after Tasman, William Dampier, an Englishman, explored the west coast, leaving his name in Dampier Land, but he gave such a poor account of the dry and sandy coasts, and the barbarous natives he saw there, that for a long time no one cared to face the long voyage round Cape Horn or the Cape of Good Hope with so little reward at the end of it.

These first dwellers in Australia, owing to very poor food, were stunted

and stupid. They generally lived a wandering life, sleeping in holes in the ground. They were considered the ugliest and most uncivilized of all the native races. It is slow and difficult work to try to improve the blacks, who seem to be slowly dying out as a race; they have never been numerous nor of much account.

Now, before Wolfe made his famous attack upon Quebec, a young sailor-officer helped to sound the St. Lawrence and make charts to guide the ships which were carrying the troops.

THE SAD CHAPTER OF AUSTRALIA'S STORY THAT BEGAN AT BOTANY BAY

So well was this work done that later he was sent by George III to the far-distant and almost unknown South Pacific to find new lands for England there. This was the great explorer Captain Cook, who was gifted with untold energy and perseverance. He approached "New Holland" from the Pacific, and on board was a friend who had gone out with him to study anything new they might meet with in birds, animals and plants.

They called the east coast which they explored New South Wales, and the spot where they landed they called Botany Bay, because of the rich harvest of all sorts of flowers and plants.

Botany Bay! Those words, which bring a picture of brilliant flowers to our mind, are the heading of a very sad chapter of Australian history. Eight years after New South Wales had been claimed for Great Britain, a very different party from that composed of the gallant captain, the enthusiastic botanist and their bronzed and daring sailors landed near Botany Bay.

HOW 700 PRISONERS FLEW THE UNION JACK ON THE BIRTHDAY OF AUSTRALIA

It was on January 26, 1788—now kept with rejoicing as the birthday of Australia—that 700 prisoners, convicted of ill-doing at home, stood, with those in charge of them, around a flagstaff which had been hastily raised, and cheered as the Union Jack was run up to the top, to float out on the breeze. Then the Governor made a speech, hoping they would make the most of their chance to lead a new and better life in a new country. Till this time convicts like these, who had broken the law in England and were punished in those days by being sent out of the land, were transported over the sea to the American colonies; but, when these colonies declared their independence, the discoveries of Captain Cook were used as settlements for the poor miserable people. This first convict settlement in Australia is always spoken of as Botany Bay, but the Governor of the new little colony settled on the magnificent harbor of Port Jackson, a little farther north, on the shores of which has grown up, in about 100 years, the splendid city of Sydney.

The little fleet of sailing ships bringing these first convict settlers had called on their way, during a long, dreary, cramped voyage of many months, at the Cape of Good Hope, to take in food and animals with which to stock their farms on arrival; for as yet there were no domestic animals in Australia; no sheep, cows, horses—not even rabbits; and no corn, nor vegetables, nor fruits, such as white people are accustomed to live on. There was not a single animal from which to obtain milk, nor a single plant of which to make bread. At first there was much suffering from want of food and other necessaries, but by degrees farmers went out to settle, and things began to improve.

THE TROUBLED BEGINNING & THE WEALTH BEYOND THE BLUE MOUNTAINS

For a long time the colony did not grow quickly, for, besides the food difficulty, the presence of so many thieves and other idle characters was a great hindrance. Then, again, the great blaze of war which finished the mighty duel between France and England gave men plenty to do and to think about nearer home. The few who did go to Australia slowly settled on the fertile and well-watered east-coast lands, and then on the beautiful island of Tasmania across Bass Straits, for a steep mountain range with great cliffs 2,000 feet high in parts shut them away from the wide uplands and deserts beyond them in the interior.

Then there came a change. A kind of sheep, famous for its splendid woolly coat, was brought to the colony at the beginning of the nineteenth century, and throve wonderfully. Then a way was forced through the rugged passes of the Blue Mountains, opening up vast grassy lands stretching away and away to the west. These "sheep runs" are often called the true wealth of Australia.

THE LAND OF WHEAT AND GOLD

A GOLD-MINE IN NEW SOUTH WALES AND THE TOWN THAT HAS GROWN UP AROUND IT

TEAMS OF HORSES PLOWING THE WONDERFUL WHEAT LANDS OF NEW SOUTH WALES

REAPING IN THE GREAT WHEAT-FIELDS OF NEW SOUTH WALES

Gold and wool and fruit are the chief things which make Australia rich. Science enables the gold-miner to get every scrap of gold out of the rock he quarries, mostly in the highlands of the southeast and west. It enables the farmer to cultivate his land in the best way and to raise the most bountiful crops of wheat and maize. Science and honest toil make Australia one of the world's greatest storehouses of natural riches.

Next, at the end of the war, after Waterloo, many soldiers wanted employment, as did also the "hands" that were thrown out of work by the introduction of the rapid and tireless iron and steel fingers of machinery.

THE SHEEP RUNS FROM WHICH MOST OF THE WORLD'S WOOL COMES

And so men went out to Australia. They became shepherds, living a rough life in huts while tending large flocks, roaming over the open country; or they leased tracts of land of their own and were called "squatters." These now live in comfortable bungalows called "stations" and are often helped by the "blacks," who make good stockmen. The sheep thrive because the climate is mild, and there is plenty of room for them to wander about and to find the tufts of wild grasses and shrubs which suit them well.

There are millions and millions of sheep now in Australia which supply the greater part of the wool used in the world. Shorn from the sheep's back, the fleeces are tightly packed and brought down to Sydney and other great ports to be carried over the seas to keep busy the mills and workers in the busy manufacturing towns of the leading nations of the world. Yet it is only little over one hundred years since the first fleecy sheep were taken to Australia!

Some men's fancy led them to farming and gardening, especially on the strip of well-watered coast land on the east slope of the mountains. This Great Dividing Range, which runs down the east side of Australia, is something like the Pennines, which part Lancashire and Yorkshire in England. Both influence the climate of the country to east and west, and both hold untold wealth in their rough sides. In the Pennines it is chiefly coal; in the Dividing Range it is chiefly gold; and it was gold that made the next great change in Australia.

WHAT HAPPENED WHEN A SHEPHERD PICKED UP A LUMP OF GOLD

A shepherd picked up a lump of gold while looking after his flocks, and brought it into Melbourne, a small village at that time, when Queen Victoria was a girl. There is nothing that excites people more than to hear that gold can be found in any particular spot; and as it became more and more certain that gold was plentiful in Australia, men rushed with spades and pickaxes from every part of the world. Clerks threw down their pens; students and teachers threw down their books; sailors left their ships; policemen left their beats; lawyers, doctors, merchants—all caught the "gold fever" and sought for the precious metal which was to be found in the gravel of the beds of streams and in the mountain slopes of the Australian Alps, as the southernmost part of the Great Dividing Range is called, some 60 or 70 miles behind Melbourne. This city of Melbourne grew suddenly very rich, for in ten years $500,000,000 worth of gold rewarded the "diggers."

Now, all these diggers needed food and shelter and clothes, so the farmers got good prices for their meat, vegetables and flour, and a trade sprang up bringing manufactured things from England. Then, again, when the first richness of the finds abated, many of the diggers settled down to farm and grow fruit, or keep sheep on the lands they had discovered in their hunt for gold, and the land proved good for these purposes.

VICTORIA, AUSTRALIA'S SMALLEST STATE, WHERE THE GOLD COMES FROM

There was no question about the colonies' growing now, and by degrees the states took shape as we see them to-day, starting from the large, original colony of New South Wales.

The gold colony, Victoria, about the size of Great Britain, was cut off from New South Wales in 1851. Although the smallest, it is one of the richest and most important of the colonies, and the most thickly peopled in Australia. Besides the gold which is still mined in it, Port Philip receives and sends away great quantities of wool from the pastures of rich grass which cover about three-quarters of the province, and the fertile soil and mild climate are good for growing all sorts of corn, fruits and vegetables. Its capital, Melbourne, is so fine with its wide streets, splendid buildings, its great trade, needing miles of busy wharves, that it is often called "Marvelous Melbourne." Trolleys, omnibuses, hansoms, motors carry passengers about, as in America, and there is as great interest in cricket and football as in

THE NATURAL WEALTH OF AUSTRALIA

ONE OF THE WONDERFUL ORCHARDS OF WESTERN AUSTRALIA, WITH A VINEYARD BEYOND

ENORMOUS LOGS CUT FROM THE GREAT FORESTS OF AUSTRALIA LYING AT THE SAW-MILL

PREPARING WOOL TO BE SENT FROM AUSTRALIA INTO ALL PARTS OF THE WORLD

The wealth of the world is all in the soil. Men have only to develop it. Here by their labor they have created vast orchards and fruitful vineyards. They have cut timber which the steam-saws make into boards for building houses. They have bred sheep which yield abundant wool, that is packed up and sent away from the seaports to America and other parts of the world, to make warm clothes for us in winter.

any town in Great Britain. Crowded pleasure boats steam about the bay, beautiful tree ferns grow in the valleys close by, and delicious fruits are to be had for a few cents a pound in the shops.

NEW SOUTH WALES, AND HOW SQUATTERS HAVE BUILT UP ITS PROSPERITY

New South Wales threw off a northern colony called Queensland in 1859, but the land it has kept under its old name is twice as large as California. The chief industry of New South Wales is still wool. The squatter, who also rears great herds of cattle, has two great difficulties to face. One is that there is often very little rain for months together, and the food for the flocks and herds dies down—all but the shrubs which grow on the desert lands—and sometimes the poor animals die in thousands for want of water when the springs and rivers are all dried up.

The other difficulty is rabbits. It was a sad day when these little creatures were brought to Australia. They have increased so enormously that they often completely spoil a squatter's run by eating up all the grass needed by the sheep. Great efforts are being made to get rid of them.

New South Wales grows much fruit, such as oranges and peaches; also fine wheat and vegetables. At each side of its splendid capital, Sydney, are coal-mines; here is another Newcastle, black with coal-dust! There are other valuable mines, too, yielding gold, silver, copper, tin and lead.

Sydney is built all along the bays and promontories that make up the magnificent harbor. It is the fifth port of the Empire, as only London, Liverpool, Hull and Montreal have a greater trade. Large ships can come up to any of the wharves right in the heart of the city, and busy little ferry-boats dart about from various points, carrying passengers and goods.

QUEENSLAND, AND THE NEVER-NEVER COUNTRY WHERE RAIN IS SELDOM SEEN

Queensland is nearly twice as large as British Columbia, and reaches right away to the north of Australia. The short slope toward the Pacific is hot and damp, and produces things which grow in this sort of climate, such as cotton and sugar and rich fruits. Higher up the slope is grown wheat, and above that, in the highlands, are wide stretches of downs where enormous numbers of sheep are fed. Passing on to the long westward slope, the country becomes drier, and often great difficulty is found in getting enough water for the flocks and herds of cattle. Deep wells have to be bored, often without success, and after great expense. The part of Queensland that is subject to the greatest want of water is called the Never-Never Country. The Editor of this book has heard of a little Australian reader who had never seen rain when she was nine years old!

Brisbane, the chief city, depends on coal found in its neighborhood, and on wool. Queensland is rich in gold, copper and silver, and also sends away much timber.

SOUTH AUSTRALIA, THE WONDERLAND OF VAST DESERTS AND SPACES

As we look at the map, we realize the vast deserts that take up the centre and west of the island-continent. The province of South Australia, as large as France and the Spanish kingdom put together, which is really a great slice of the middle of Australia from north to south, has most of this desert land. Many explorers have lost their lives trying to find out its vast unknown centre. It was not till 1861 that anyone succeeded in getting right across. A few years later a splendid piece of work was done along this rocky and sandy track. Telegraph poles, telegraph wire, provisions and all necessaries were carried from Adelaide on the south to Port Darwin on the north. Wells had often to be dug for water, and after two years of hard work and endurance a line of telegraph was completed over 2,000 miles long. Yet more than half of this distance had been traveled only once before by white men.

Thus Australia was connected with the rest of the world, for the messages flash from Port Darwin to Java, thence to India and the West. And so it is that we can read in our morning newspaper the account of yesterday's doings in the far southern hemisphere, whether they have to do with business about wool or gold, or with a concert or a cricket match.

There are many lines of railway in Australia to connect the settled parts of

AUSTRALIA, THE VAST ISLAND CONTINENT IN THE SOUTHERN SEAS

As we look at the map of Australia we are struck by three things: its compact outline cut up by few bays or gulfs, the absence from it of navigable rivers communicating with the interior, its isolation from other lands. There are no active volcanoes in the country, no snow-capped mountains.

the country, and in 1917 the first great transcontinental road was finished.

A RAILWAY BUILT THROUGH A WATERLESS DESERT LAND

This road stretches from Port Augusta, in South Australia, to Kalgoorlie, in Western Australia. By joining the railways, which reached these towns, it has made the last link in a chain to bind the eastern and western states together, and it is now possible to go by train from Perth to Brisbane. After it leaves the wooded part of South Australia, the road runs over hundreds of miles of treeless, waterless plain, but it is hoped that water from deep wells will make the land fruitful.

The climate of the settled south part of South Australia is like that of South Europe, and the same fruits grow in both, such as grapes, oranges, lemons, olives. A great deal of wheat, too, is sent away to Great Britain. Farther north there are large flocks of sheep and very valuable copper-mines.

Adelaide, the capital of South Australia, has fine parks and gardens, and behind it are lovely valleys, in which many kinds of fruits and vegetables are grown.

The richest silver-mine in the world lies in the bare desert country 350 miles beyond Adelaide. It is an astonishing sight to those who visit the spot. Scarcely forty years ago Broken Hill was a lonely sheep station. Thousands of people crowded to it when silver was found, and now it is a large town. The huge engines for getting the ore out of the mines stand up against the sky. The furnaces and machinery give off incessant heat, amidst great noise, as they turn out tons and tons of silver and lead ready to go by rail to the seacoasts. Then there is all the return traffic of fuel, food and other necessaries, many of them brought from the other side of the world.

WESTERN AUSTRALIA, THE LARGEST STATE, AND THE ISLAND OF TASMANIA

Western Australia is the largest of the Australian states; almost four times as large as Texas. A great deal of it is desert, like South Australia, and much is still unexplored. There are large forests; wheat and fruit are grown in parts, and there is country suitable for sheep and cattle. Gold forms the chief riches of West Australia at present. Great quantities are found at places where water has to be brought in pipes over 300 miles. Perth is the capital.

Tasmania, about the size of Scotland, is a beautiful island, within a day's journey of Melbourne. Its narrow, fertile valleys are good for agriculture and fruit-growing, Tasmanian apples and pears being especially famous. From the sheep-farming comes very good wool. There is no trouble about want of rain in Tasmania, and the climate is so cool and pleasant that many Australians—especially from Queensland—come here to spend the summer. One of the most valuable tin-mines in the world is in Tasmania; there are also coal, gold and silver mines. Hobart is the chief town.

When we look at the divisions of Australia on the map, ruled off by the lines of latitude and longitude, we are reminded of Canada. As is the case with Canada, these large states with their straight boundaries are united with Tasmania under one common government.

HOW AUSTRALIA BECAME ONE NATION ON THE FIRST DAY OF THIS CENTURY

This federation took place on the first day of the twentieth century, and formed the great Commonwealth of Australia, which has, like Canada, a central Parliament, elected by itself to settle its own affairs, and a Governor-General sent from England to represent the king.

Many new experiments for the benefit of the common man have been tried, and the people of Australia hate all tyranny. During the World War Australian soldiers fought bravely for civilization in Europe, Asia and Africa.

But how unlike are Canada and Australia in other ways! The north lands of Canada push up into the frozen waters of the wild Arctic Ocean; the north peninsulas of Australia reach up to the warm waters, infested with sharks, of the hottest part of the world.

In Australia there is no mighty river like the St. Lawrence, with its chain of lakes as large as inland seas, by which travel and commerce reach into the heart of the country. Many of the rivers and lakes in Australia dry up in summer. The Murray River and those that join it are the chief exceptions. Many of the lakes, also, are salt; and so it comes to pass that most of the centre of the continent—far away from

NATIVES OF THE ISLAND CONTINENT

Natives of the northwest.

Aborigines outside their huts.

Aborigines wearing the dress of the white man.

Native warriors of Kimberley, Western Australia.

moist sea-breezes—is a pathless, stony desert, on which neither men nor animals can live. As we have seen, it is on the rim or edge of Australia, especially on the east and southeast, that we find most of the work and wealth for which the country is so famous.

WHERE BIRDS WALK AND FOXES FLY AND SWANS ARE BLACK

No one knows how long before the white people came the poor savage blacks wandered over the broad continent, hunting the strange native animals, finding water, when all other water failed, at the roots of the desert plants, and living in holes in the ground.

Strange-looking animals and plants they are! There is the kangaroo, quite different from all other animals, with its powerful hind legs and tail, and a pouch for its little ones. The water-mole, with a bill like a duck, is equally curious; also the emu bird, which walks instead of flies. The kiwi wears hair instead of feathers; the laughing jackass and the brilliant parrots and cockatoos laugh or screech instead of sing. To crown all, the swans are black and the foxes fly!

The native plants and trees seem equally strange to us. Most of them shed their bark instead of their leaves; and many turn only the narrow edge of their leaves to the sun. The eucalyptus, or gum, tree grows to a great height, and gives a valuable medicine. Splendid timber comes from Queensland and other provinces, from great forests, very dull and gray-looking, lit up here and there with the vivid colors of the flying-parrots and other gay birds. Many of the wilder parts of the country are covered for miles and miles with useless and dangerous plants, such as spinifex or porcupine grass and other prickly scrub. All these were the heritage of the "blacks."

THE GREAT ENERGY THAT HAS MADE AUSTRALIA A GREAT NATION

In the short space of time since the white nation came to settle in the island-continent, nearly every known plant that is good for food has been introduced, and finds some part of the country to suit it. Think of the work of the pioneers in getting the land ready, in choosing crops, in bringing to perfection all the produce of this wonderland.

Then think of the energy and hard work needed to start the mines and keep them going, often in hot parts of the country, and the anxieties connected with farming, especially in early days when there were many difficulties now smoothed away by machinery and by easy ways of carrying and traveling.

Though so much has been started and accomplished in little over 100 years, every year sees a fresh outlet for the energies of Australians. The peaches that could neither be eaten nor sold but had to be carried off in buckets to feed the pigs, because there were so many, are now canned to feed human beings thousands of miles away. The grapes are made into wine, currants and raisins; many fruits that would otherwise die are packed and sent oversea in cold chambers, just as quantities of beef and mutton are exported frozen hard in perfectly good condition. As engineering takes a hand in saving rainfall through dams, irrigating dry lands, and reaching the underground waters through borings, the area of the continent fit for settlement will be widely extended, and Australia will be one of the world's foremost nations. Manufactures of various kinds are starting and only want a larger number of people to work them.

TEN THOUSAND MILES OF TRAVEL IN SIX WEEKS AT SEA

And now, having had a glimpse of what there is to see in Australia, shall we go to England by the Empire route—called the "All Red Route," because the whole of it is marked in the British color, red, on the map—which has done so much toward linking up Australia with Canada and Canada with Britain?

We can take the steamer at Sydney, and make our way through the beautiful islands of the wide Pacific, gradually losing sight of the stars of the Southern Cross as we travel north. In about twenty-one days we shall slow down at Vancouver, the terminus of the Canadian Pacific Railway. About ten days more will bring us across the Dominion and the Atlantic Ocean to Liverpool.

There are many other routes if we prefer to go all the way by sea—through the Suez or Panama Canals or round the Cape of Good Hope or Cape Horn; but it will take six or seven weeks to complete the voyage of over 10,000 miles.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 2571.

THE WONDER OF DRIPPING WATER

This is the inside of a cave on Margaret River in Western Australia. Thousands and thousands of beautiful white columns, long and short, hang down from the roof, ending in perfect star shapes. They are called stalactites. Seen against the dark cavern, they look like a shower of stone meteors; but they are really formed by water dripping from the roof, drying up and leaving mineral matter behind.

This is another view inside a cave in Western Australia, which looks almost like a dry-goods store. When the cave is lit up with electricity it is seen to be hung with pure white stalactites like alabaster columns, showing light through their edges. Many of them glitter like gems, and others form into shapes like folded lace-edged shawls, rugs, tents and other woven things. You might fancy some of them were icicles.

The Balcony, a striking picture by Edouard Manet, who brought a new note into French art.

A portion of a wall painting by Puvis de Chavannes.

FRENCH ART GOES OUT OF DOORS

CONTINUED FROM 2376

WHEN about half of the nineteenth century had passed, there came a new movement in French painting, led by two artists, Courbet and Manet. Like all other movements, it presently was given a name, and as "naturalism" it became responsible for great changes and developments in European art.

Courbet and Manet were weary of the classical and romantic painters. They disliked Ingres because he hated anything that was not Greek in feeling; and they disliked Delacroix because they found that the men and women in his pictures were not natural: the kind of people one would expect to find in story-pictures of history and legend. In treatment, as in character, however, they were artificial.

As for the type of person Delacroix and his followers painted, Courbet and Manet insisted that there was no reason for its being put on canvas at all. It was not the province of an artist, they said, to make pictures that were explanations of a theory or a scene in history: it was his work to paint natural men and women in natural occupations and surroundings. So this little battle waged in the Paris studios. Much friendly controversy there was, but the new naturalism prospered. It never became a school in itself, but it prepared the way for a very big school—impressionism.

Gustave Courbet, who lived from 1819 to 1877, was a remarkably vigorous kind of man who did not in the least mind making himself ridiculous. He shouted down opposition, both in the way he argued and the way he painted. Indeed, Courbet's work is an excellent illustration of the theory that a reformer must say a thing three times, very loudly, in the hope that he may be heard once.

This artist began to paint peasant men and women on a huge scale with a brutal strength in treatment and a very liberal use of dark shadows. It seemed that the persons were thrown on the canvas. His coarse and bold brush strokes shocked the people who had got used to the smoothness of the classicists and the well-mannered painting of the romanticists. But after a time they began to see reason in his theories, and the men who followed him carried his logic further than he did himself.

Like Manet, the younger man, Courbet reverenced the work of Velasquez and Ribera in Spain, and Caravaggio in Italy, and from these last two he got his love of violent contrasts of tone. He was only half a

naturalist, because he painted men and women in his studio and set them in a landscape, just as he would have set them in the background of the studio walls. That is why his figures so often do not seem to belong to their settings. But he painted real people as he saw them, and did not try to make the picture tell a story or to make the people one whit more beautiful than they were; and that in itself, in his generation, was a great step forward. He had in a very high degree the feeling, or sentiment, of reality.

THE FINE PICTURES OF COURBET THAT BEWILDERED HIS CONTEMPORARIES

When we look at Courbet's work now, it seems not very unusual. We admire the finely painted faces in his famous picture The Funeral at Ornans, in the Louvre. We perceive the fine truth and naturalness in his picture The Stone Breakers, in the Dresden Gallery. We are impressed by his sea pictures and his landscapes, free from any trace of human life, "as if man were not." But had we lived in mid-nineteenth-century France and seen this kind of thing for the first time, we should probably have been a little bewildered.

Edouard Manet (1832–83), who followed hard on Courbet's heels, attempted something of which the other artist, by his very nature, was incapable —the treatment of light. Courbet had never accepted the existence of light, except to illumine his dark and general tones, but Manet laid down a theory that the principal person in a picture is the light.

THE INFLUENCE OF VELASQUEZ ON THE WORK OF MANET

From the study of Velasquez this young French artist learned to simplify color and tone, and to paint only what he could actually see rather than what he knew must go to make up the subject before him. From this he went on to independent attempts and discoveries, as when one day in 1870, sitting in full sunlight, he painted a family group in a garden. This has been called the début of "plein-air" (literally, "full air") painting. The problems Manet delighted in were those of the ever changing qualities and quantities of light. Probably his greatest gifts were his fine and vibrating touch and his instinct for grouping colors. Of his early work the Boy with a Sword, in the Metropolitan Museum, is a good example. Of the later paintings, Breakfast on the Grass and the Bar at the Folies-Bergère are especially well known.

The problem of the treatment of light was worked out in two ways by the artists of France—through *plein-airisme,* the study of the appearance of light and color out of doors; and impressionism, a method of painting light and color. Since French art now leads the art of the world as Italian art once did, we shall try to understand this development so that we may be able to judge the work of the world.

It was urged by the open-air school that if a natural object is to be rendered well, it must be painted on the spot in its natural surroundings. We can see this for ourselves quite clearly. If a person sits in a room, the light falls on that person from as many windows as the room contains. If a model is posed in a studio lighted from the north side only, in the customary way, the amount and direction of light and shadow can be calculated to a nicety. The painter can work away, knowing that the light will fall on the right cheek, the right side of the nose, the right shoulder, and that the left side will be correspondingly in shadow. The only complexity will be the reflected light that comes from any object near which the model may be posed.

THE DIFFERENCE BETWEEN STUDIO WORK AND PAINTING IN THE OPEN

And the quality of light that comes into a room thus arranged can be calculated. The difference between the light and shade on a red, blue or brown object can be exactly estimated. It is because painting in a studio is freed from many problems that the art student, working under these conditions, gets the best out of his studies. He can concentrate on the foundation subjects of line, tone and texture—in a word, he can learn how to draw and paint.

But take the model out of a carefully arranged studio and set him or her in the open air. Here the light comes from every quarter in a most bewildering way. The painter can no longer calculate on the "left side in shadow, right side in light" effect. And if the figures are placed anywhere but in the middle of an open field, the light falling on them is affected in another way. Trees, water, a house-side all catch the rays and throw them back on any figure standing near.

A River in Summer, landscape by Claude Monet.

The Seine at Argenteuil, by Claude Monet.

The Blessed Bread, by Dagnan-Bouveret.

The Firing Party, by Manet.

The Stag Fight, a forest scene by Courbet, in the Louvre.

A landscape, by Courbet, in the Metropolitan Museum of Art.

The Shepherd's Song, by Puvis de Chavannes, in the Metropolitan Museum of Art.

A Bishop and St. Geneviève, by Chavannes.

St. Cecilia, by Gustave Moreau.

Joan of Arc, by Jules Bastien-Lepage, in the Metropolitan Museum of Art.

Boy with a Sword, by Manet.

The Old Beggar-man, by Bastien-Lepage.

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Moreover, these rays are colored, and they constantly change as the hours of the day go by, so that, except for actual shape and form, the model presents as different an appearance out of doors from indoors as can be imagined.

It was when artists realized this that they saw they must paint the people in their pictures of rural life—shepherds, peasants, farm laborers—actually out of doors if they were to be true at all. So we see the first two steps of the new movement in French art: the desire to paint natural everyday people for their own sake, and the actual painting of those people in their ordinary surroundings.

The most important of the plein-airists in France was Jules Bastien-Lepage. He painted some beautiful and tender pictures of peasant men and women in the fields; the gray surface light that lies on trees and grass wraps his figures round, so to speak, making them one with their surroundings. He was quick and sure in observing; and while he could beat most of the realists on their own ground, he shows imagination as well—a sort of intellectual imagination. His best-known open-air picture is Haymaking, in the Luxembourg Gallery, Paris. His painting of Joan of Arc, in the Metropolitan Museum, New York, is familiar to most of us. Someone has said that each of his peasant girls is a possible Joan of Arc.

A BRILLIANT PAINTER OF THE HUMBLE PEASANTS OF FRANCE

Other painters made pictures of people in more brilliant and sunny surroundings. But, in general, the effect of the open-air school was a fashion for painting humble workpeople—men in factory yards, laborers in fields. Every year pictures are exhibited which still reflect this movement of fifty years ago. Dagnan-Bouveret has probably worked out the theme of the peasant further than anyone else. His best-known picture is The Conscripts, in the Palais Bourbon, Paris.

While the plein-airists were working out their ideals of open-air work other painters were saying: "This is not enough; in fact, it is only the beginning." These men felt that although artists had gone, and very rightly, out of doors to paint subjects of open-air life, they were only a little nearer to getting real light into their pictures than the academic painters who insisted on painting studio pictures in the traditional way. They felt that the brightest color on a canvas could never rival its model in nature, for that is color plus light; and that the clearest, bluest sky in a picture would only look something like the sky when the canvas was seen indoors.

AN IDEA OF VELASQUEZ, AND HOW IT HELPED THE FRENCH PAINTERS

The solution to the problem was a scientific one. We know that the existence of color is due to the breaking-up of pure rays of white light. Velasquez had shown long ago in his technique that color loosely treated—that is to say, color broken here and there—is more alive, vibrates more, than color tightly and evenly laid down.

The French painters carried the idea further and said that pure light could be shown by the actual breaking-up, on the canvas, of colors into which in nature that light is broken. Take, for instance, a blue sky, which is blue plus light. Any one of us possessing a few tubes of oil paint and a canvas can experiment on the lines laid down by the French painters. We know quite well that if we paint a blue sky with one solid color, as a workman paints a door, it is a very nice blue, but it could not possibly be said to be like the sky, because there is no light in it.

THE BIRTH OF IMPRESSIONISM IN THE ART OF FRANCE

The chief colors into which pure light is split are blue, red and yellow. For a summer sky we choose a delicate variety of these colors—cobalt-blue, rose madder, lemon-yellow. We begin at the top left-hand corner of the canvas and proceed to lay on dabs of pure yellow in a straight line, with a scrap of bare canvas in between each. When the whole of the portion of the canvas supposed to be the sky is thus covered, we carefully clean our brush and begin at the top again with dabs of rose madder, laid so that the yellow shows in between.

The colors must not be mixed with the brush on the canvas, but laid as cleanly as possible. Then again we clean the brush, and lay on dabs of cobalt. When the sky is covered we can go over it delicately and very lightly, here and there blending the colors—but how far this mixing may be done can be determined only by experience in technique.

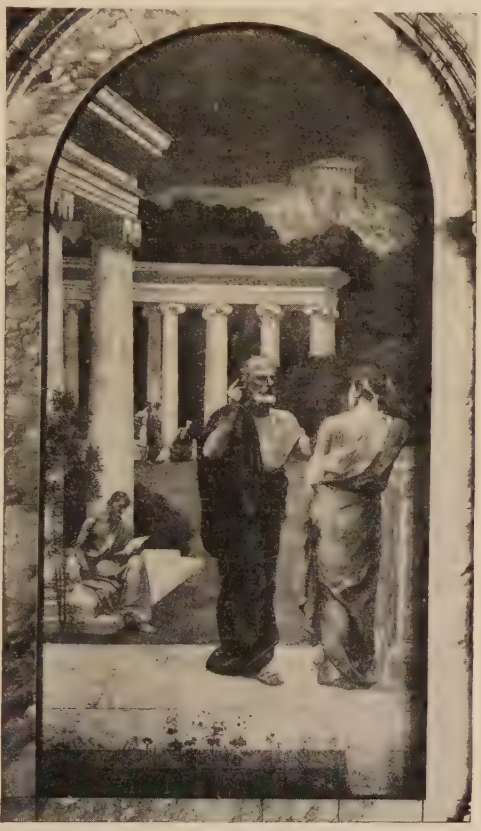
If we then paint under the sky a bar of gray-green, which seems to us to be the right tone for a field lying under the

sky, and a simple object, such as a hurdle or a wheelbarrow—something to give the effect of tone—and then set the canvas at the other end of the room and look at it, we shall see in that sky warmth and light.

If we had mixed the three colors on a palette, we should have obtained a delicate gray. Left in vibrating patches of clear color, they give the illusion of the summer sky. The method is most successful when used in oil painting.

But we must remember that in trying to be fair to the impressionists and their followers, who upset all our ideas on art, it is necessary to look at their work in a special way.

A great many people look at an impressionist picture at close range, as they would a little water-color landscape, and they say, "What nonsense!" When they get to the other end of the room they see that the canvas which before appeared a mass of meaningless daubs



Photos, courtesy of the Trustees of the Boston Public Library.

Panels illustrating Philosophy and History, by Puvis de Chavannes, in the Boston Public Library.

This style of painting was evolved by the French artists, and from a study called An Impression, by Claude Monet, it came to be called impressionism. Another explanation for the origin of the term is that Manet, in one of his exhibitions, catalogued some of the pictures as "Impressions," and that the exhibition was summed up as a "Salon of Impressionists." Nowadays, impressionism has given place to other movements, which are based on a definite scheme of thought, and we shall be thinking of those later.

now gives a broad and satisfying impression of some aspect of nature.

Nature, we must remember, again, is seen at close range only by inches. A field of corn which is golden at a distance, presents at near sight a hopeless tangle of green, yellow, gray, red and blue stalks, with the dun earth showing between. So, in demanding that their pictures shall be studied at a distance, the painters of impressionist landscape are only asking us to treat them with the same consideration that we extend easily and naturally

to the real scenes they attempt to portray through the medium of paint upon canvas.

The early impressionists, who to the moderns are now ancient history, centred their efforts on this single problem of showing color imbued with light. It was their life's work, and they met with bitter opposition and contempt. In our own day there are few painters of any standing who have not adopted, in some degree, their theories. The work of the early impressionists was simple representations of certain aspects of nature and life, and in general they passed by the problems of composition and decoration altogether.

CLAUDE MONET, WHOSE PICTURES RECORD "ATMOSPHERIC MOMENTS"

Claude Monet, born in 1840, was the leader of the movement. His paintings of sunlit landscape give an effect of greater illusion than anyone had ever achieved before. He gained the illusion by painting the part of the picture not in sunlight lighter than it would have appeared before the burst of sunshine came.

Some of his pictures, such as the early morning visions of Rouen Cathedral, seem "miracles of luminosity." A haystack or a lily pool would furnish him a theme for almost endless variations of studies, made under different light conditions at different times of the day. When a change of light came—after about thirty minutes—a study must be set aside, to be resumed only when the light conditions were again the same as when it was started. He could give an effect of the utmost reality and produce great variety in light and color.

Both Monet and his associate Camille Pissaro (1831–1903) were continually trying to catch an impression of some "atmospheric moment."

THE BEAUTIFUL PICTURES OF AN ARTIST WHO WAS ALSO A POET

The impressionist movement was almost as much disliked in Paris, its home, as anywhere else, and naturally there were many artists who worked at their own ideas in their own way, and took no notice of the new school. It happened that one of them was among the finest decorators European art has produced. His name was Puvis de Chavannes.

Puvis was half poet, half painter; his pictures are beautiful restful dreams. He turned away from the dead elegance and meaningless finish of the academic painters and evolved a scheme of presentation of his own, where figures go gently by in even, flat tones and there are no aggressive patches to call the eye away from a perfect harmony of color.

This artist seemed to see the spirit of life passing through the world. Labor and hope, rest and play, love and kindness, are written in lovely forms on his frescoes. The Poor Fisherman, in the Luxembourg, is a tender and beautiful painting, and carries our minds centuries back, to Duccio and the Sienese.

Pictures painted by Puvis de Chavannes from the life of St. Geneviève, adorn the walls of the Panthéon in Paris. There are few things in art more still and beautiful than the panel showing the saint watching over Paris. Another famous picture of this decorative painter's is The Sacred Grove, in the Lyons Museum. Many towns in France treasure paintings by Chavannes. In 1896, when he was seventy-two years old, the great decorator finished his paintings for the walls of the Boston Public Library. These represent the Muses Saluting the Spirit of Enlightenment, and, in eight panels, the Arts and the Sciences.

MEN WHO REMAINED FAITHFUL TO THE OLD STYLE OF PAINTING

Gustave Moreau and Paul Baudry were two gifted artists who also kept aloof from the impressionist movement. Baudry's work is marked by clever grouping of figures and beautiful painting, as in The Toilet of Venus, in the Bordeaux Museum, and Fortune, in the Luxembourg.

Moreau's paintings show something of the intellectual ideals that underlay the work of Pre-Raphaelites in England. His pictures are symbolic, and their meaning haunts the mind after the eye has passed them by. The Apparition, Venice, and Orpheus, in the Luxembourg, are fine examples of his skill.

So we see the many ways in which French art, as the nineteenth century went by, expressed itself. The new movements and the old prosper side by side, and each year memorable work is done. And even if we do not quite understand the very modern work, we must remember that the men in the world who know most about painting have long been looking to the French genius for the future of art.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 2709.

The Siloam Inscription, a Jewish newspaper of twenty-six centuries ago.

WHEN DID NEWSPAPERS FIRST BEGIN?

CONTINUED FROM 2362

THE newspaper in its modern form is usually regarded as beginning in 1566, when the Venetian Government issued written news-sheets and exhibited them in the streets. Anyone was allowed to read them on payment of a small coin called a *gazetta*. On this account the news-sheets were called gazettes, and they became so popular that they were printed. Soon after the date mentioned, gazettes were issued in most of the big cities of Europe. The first English newspaper was the Weekly News, published in London in 1622. But in this paper and its successors down to 1641 only foreign news was printed.

While newspapers in the modern sense are thus less than four centuries old, something corresponding to the newspaper was found in the ancient world. Accounts of the doings of the imperial armies of Rome were sent to generals in command in all parts of the empire. These *Acta Diurna*, or Daily Doings, as they were called, were communicated by the generals to their officers.

Farther back still, items of news, generally about kings or battles, were carved in stone in prominent places in Babylonian and Assyrian cities. These may almost be regarded as the origin of the newspaper as a record of events. Probably the oldest newspaper in this sense is the Siloam Inscription, discovered in 1880 in the rocky aqueduct of the Pool of Siloam at the southeast end of Jerusalem. The characters are those of an early form of the alphabet used by the Phœnicians, Hebrews and Moabites. The language is Biblical Hebrew. The inscription is of the period of the Hebrew monarchy.

It dates back to at least 700 B.C., and is the oldest Hebrew inscription known. It may be called the Jewish newspaper of Isaiah's time, and perhaps even of Solomon's time. Freely translated it reads thus:

> Finished is the boring. And this was the manner of the boring. The hewers were plying the pickax, each toward his fellow, and there were still three cubits to finish, when there was heard the voice of one calling to his fellow; for there was a crack in the rock on the right. And on the day of the boring the hewers struck each to meet his fellow, pickax to pickax, and the water ran from the source to the pool, two hundred and a thousand cubits. And a hundred cubits was the height of the rock above the heads of the hewers.

It sounds very modern. Just such a paragraph might announce the completion of the cutting of a new tunnel through the Rockies, for instance.

WHAT DO THE THREE BALLS OVER A PAWNBROKER'S SHOP MEAN?

The three golden balls were originally the arms of the famous Lombard family of the Medici. They were probably intended to represent gilded pills, either as a pun on the name Medici or in honor of the profession of medicine in which some members of the family had excelled. When representatives of the Medici family went to London and set up as merchants and money-lenders in what is now Lombard Street, they displayed the three balls over their places of business as their sign. Soon other money-lenders copied their example. The three golden balls came to be the recognized symbol of those who lent money, receiving the property of the borrowers as a pledge.

WHY HAS A HOP KILN A FUNNEL-SHAPED MOVABLE TOP?

The curious funnel-shaped top of a hop kiln, or oast-house, is made to move round so that it can always be turned away from the wind. When the hops are drying inside the kiln the vapor rises and passes out through the hole in the top of the roof. If the wind were blowing down this hole, the vapor would be driven back into the kiln and the hops would not dry properly. This possibility is overcome by having a funnel-shaped top to the roof that can be turned in any direction.

WHY IS THE BOTTOM OF A CAN HOLDING FOOD RIDGED?

This is to add strength to the can. Usually cans which contain powders and other dry substances have flat bottoms, as there is little pressure, and therefore no particular need for strength. But in cans which contain meats, salmon, preserved fruits, syrup, and so on, the ends of the cans are very much ridged. This adds strength in a double way. First of all, the ridges embody the principles of the arch, one of the strongest devices in architecture. Secondly, these ridges provide a certain amount of "give" in the ends of the can when the pressure of the interior gases is increased by heat in the process of cooking in retorts. With no give in the ends, the pressure might burst the can.

WHY HAVE BELLOWS A ROUND HOLE ON ONE SIDE?

Through this hole enters the air which we blow out of the nozzle. When we part the handles, thereby opening the bellows, the air rushes in through the hole. When we bring the handles together, and so close the sides of the bellows, the air is forced out. Just inside the hole is a little flap. This is a valve which opens to let the air enter. When we close the bellows the flap is forced against the hole by the pressure of air inside, and by thus closing that outlet prevents the air from escaping that way.

WHERE DO WE READ ABOUT THE GIANT GARGANTUA?

The giant Gargantua is the hero of a book written by the French philosopher Rabelais (1495–1553). Rabelais introduces this prodigious child to us as feeding on the milk of 17,913 cows every day. He required 405 yards of velvet for his boots, and twice as much for his garment. Until he was five, Gargantua was brought up without any special attention. Then his father intrusted him to the care of Ponocrates. This gave Rabelais an opportunity to show us how complete was the education of a boy of good birth at that time. Later Gargantua, his tutor and the page Endemon started off to Paris. The young man rode a huge mare which was noted for having swept down by one lash of her tail a whole forest on the way. Passing Notre Dame, the cathedral of Paris, Gargantua stole its chimes because he wanted them as bells on the collar of his mount. However, his father soon called the traveler back. He was waging a war with a neighboring lord and needed the help of the powerful boy. Thanks to the witty co-operation of a monk, Father Jean, Gargantua was victorious. As an act of gratitude he founded the famous Abbey of Theleme, of which the chief rule was: "Do as you please." Married to Badebec, Gargantua became the father of Pantagruel, whose adventures follow throughout the book. Allusions to the Abbey of Theleme, Gargantua and Pantagruel are often met with.

WHAT ARE THE LARGEST FRESH-WATER LAKES IN THE WORLD?

More than half the fresh water on the surface of the earth lies in the Great Lakes of North America, one of which, Lake Superior, is easily the largest lake in the world. It is roughly 32,000 square miles in extent, and it is 1,000 feet deep. Next after Lake Superior comes Victoria Nyanza, in Africa, 27,000 square miles; Lake Huron and Lake Michigan are not far behind. Lake Ladoga, in northwest

Russia, about 7,000 square miles, is the largest lake in Europe.

WHY DO SOLDIERS BREAK STEP WHILE CROSSING A BRIDGE?

If the soldiers kept in step, the constant and regular shaking of the bridge by the impact of their feet and the swinging of their bodies would set up vibrations leading to an ever increasing swing of the bridge. This would cause such a strain on certain parts as might eventually lead to a breakdown.

WHY DOES VACCINATION SAVE US FROM SMALLPOX?

There are some diseases from which a person rarely suffers twice. The first attack makes the sufferer immune, or proof against a second attack of the particular microbes that cause this illness. That is because, when the microbes gave out their poison the first time, the body began to brew a counter poison (or antidote) in such quantities that it remained in the blood years after the microbes had gone. Smallpox is one of the diseases against which we can be so protected. Many years ago the famous Dr. Jenner discovered that it was not even necessary to have the actual disease in order to become protected. It was sufficient to produce a very slight illness by vaccination—that is, by inoculating a patient with a small dose of the poison obtained from a calf which has been suffering from a disease similar to smallpox, namely cowpox. This sets up a mild and safe attack of the disease in the person vaccinated. The counter poison is manufactured by his body as before. In other words, he has been given a mild attack to save him from a serious one. The effect of this is found to be such that people properly vaccinated are free from the infection of smallpox for some years, generally five at least. After that the effect is likely to wear off. So in some countries it is the custom to be vaccinated every five years.

IS OUR BLOOD COLD WHEN WE FEEL COLD?

Our feelings of cold or heat come, as a rule, from the very surface of our bodies. What we judge by is what happens to the skin. If the skin is losing heat quickly, we say we feel cold. If it is losing heat slowly, or gaining heat, we say we feel hot. The blood is the most important thing which decides how the skin feels, as a rule. Of course, in special cases the skin is more affected from outside than from inside, as when we are in a cold draft or exposed to a fire. When we feel cold, our blood is not cold. It is as warm as usual. A very little of it, however, is passing through the skin, and that is why the skin feels cold. Perhaps we are in cold surroundings, and the body is keeping most of the blood to warm the great organs like the brain and the heart.

In certain illnesses the case is very striking. In malaria there is usually a shivering stage, when the patient feels very cold. His skin is pale and there is very little blood in it—that is why he feels cold. But if we take the pains to find out the temperature of his blood we shall find it much hotter than it ought to be. The patient is, indeed, in the first stage of a fever. In the second stage this hot blood will flood the blood-vessels of the skin, and the quantity and the heat of it will make the patient feel as hot as he previously felt cold.

WHY ARE ALL OUR FINGERS NOT THE SAME LENGTH?

Primitive man used his hands to keep his balance when crawling around in caves or in seeking food on the ground. If we put our hand on a table, as if we meant to walk on the tips of the fingers, we shall see at once what a well-balanced support it makes. That is because the fingers are unequal in length—the middle finger the longest, and the short thumb and little finger falling behind and balancing the whole. We see the same thing at the zoölogical gardens in the case of animals that have three fingers—as the toes of the forefeet might rightly be called. And we can notice it for ourselves any day in the dog or the cat.

WHAT DO ARCTIC EXPLORERS MEAN BY AN IGLOO?

The igloo is the Eskimo's winter hut, varying very much both in shape and in the way it is constructed. In Alaska, igloos are usually built of planks and covered with turf, while in Greenland, the walls consist of stones and sod. Often it is built simply of snow. The entrance is by a narrow half-underground passage. Though there is only one room, sometimes as many as forty people live in one house. The Alaskan Eskimos have hearths in the centre of the room, but the Greenlanders have to rely for warmth on their oil lamps.

HOW MANY COLORS HAS THE RAINBOW?

Seven: red, orange, yellow, green, blue, indigo, violet. As we look at the rainbow these glide into one another, so that at the edges the hues seem to be blended into a mixture of two colors.

WHY HAS A TRACTION ENGINE GROOVED WHEELS?

The purpose of a traction engine is to pull heavy loads, and it is almost always necessary for it to have grooved wheels which can grip the surface of a greasy road. With a big train of trucks it would be practically impossible for the engine to move forward without the slanting projections on the wheels to grip the road and give a suitable leverage. The drivers of smooth-wheeled engines often have to get down and place sacks in front of the wheels before they are able to grip the road sufficiently to move.

WHO IS TOMMY ATKINS AND WHO IS JACK TAR?

It is said that Thomas Atkins was the imaginary name used by the British War Office as an example of how to fill up the forms in a little pocket manual at one time served out to all British soldiers. The name was transferred as a nickname to the soldiers. Jack Tar originated long ago in Great Britain as a nickname for sailors, whose hands and clothes were generally soiled by tar. Some think that Tar stands for tarpaulin or oilskins. Jack was used because it is the most familiar of all English names.

WHY ARE OLD SIGN WRITINGS CALLED HIEROGLYPHICS

The word hieroglyphic is made of two Greek words meaning "sacred carving." A hieroglyphic is the figure of a familiar object, like a tree or an animal or a weapon, drawn to represent a word or syllable or sound. The name was first given to the marks found on the temples and palaces of Egypt. When we speak of *the* hieroglyphics we usually mean those of Egypt. Together they form a system of written language. Their interpretation was discovered by deciphering the Rosetta Stone, of which we read on page 3548. Some hieroglyphics represent directly the objects drawn; others stand for ideas suggested by those objects; others picture ideas whose names are similar to the names of the objects. And others represent parts of the sounds of those names. The writing of the ancient Peruvians and Mexicans was in hieroglyphics, but a key to them has not yet been found.

WHY DOES HAIR GROW AFTER THE BODY HAS STOPPED GROWING?

Certain parts of the body are capable of growing into certain definite shapes and sizes and no farther. Other parts of the body have the capacity to keep on growing as long as the body itself is alive. Thus a bone in the leg grows to a certain size and then stops. Nothing we can do to it can make it grow any bigger. On the other hand, structures which are meant to protect the body, such as the skin and hair, are constantly being worn away, and are reproduced as quickly as they are lost.

WHAT ARE THE HORSE LATITUDES MENTIONED IN SEA STORIES?

Regions of calm in the Atlantic are called the Horse Latitudes, it is said, because in the old days of sailing ships vessels were often becalmed there. And they had to throw overboard any horses they were carrying because the fresh water on board was almost finished.

WHAT DO WE MEAN BY "AS THE CROW FLIES"?

"As the crow flies" means as straight as possible, for the crow flies straight to its destination. To say that two places are twenty miles apart as the crow flies, means that, though it may be a much longer distance by road or rail or river, it is only twenty miles in a straight line. "In a bee-line" means the same thing, for a bee, when laden with honey, goes straight home to the hive.

WHY IS NEW BREAD MORE INDIGESTIBLE THAN OLD?

The digestion of bread takes place very largely in the mouth itself, by the conversion of the starch into what is called dextrins and maltose, under the action of the saliva. The more thoroughly the bread is chewed and ground into fragments, the more thorough will be the transformation of the starch. It is because of the greater ease with which toast and biscuits can be ground up by the teeth that they are more digestible than bread. For the same reason old bread is more easily digested than new bread. The indigestibility of new bread is due to the large amount of moisture it contains. This makes it difficult to chew and at the same time prevents it from soaking up the saliva. In the same way the

crust of bread is more digestible than the crumb.

WHAT PARTS OF THE OCEAN ARE KNOWN AS THE DOLDRUMS?

Parts of the ocean near the Equator where calms prevail are called the doldrums. The origin of the name is not certain, but it is believed to be a word made up from "dull," similar in form to the word tantrums.

WHO USED THE FAMOUS WORDS, VENI, VIDI, VICI?

Pharnaces, the son of Mithridates, king of Pontus, in Asia Minor, wished to take advantage of the growing rivalry between Cæsar and Pompey, who both struggled for power in Rome. This, he thought, was the opportunity for recovering his father's possessions, which had been conquered by the Romans.

Julius Cæsar was then in Egypt, where he lingered at Cleopatra's luxurious court. At the news of the Asiatic prince's design he hastened to encounter him at Zela, in Pontus. There he crushed Pharnaces' army. He brought the campaign to such a rapid end that he could sum it up in a letter to the Roman Senate in these simple words: *Veni, vidi, vici*—"I came, I saw, I conquered." The three Latin verbs, with their equal number of syllables and the recurrence of their consonants, make still more striking the promptitude displayed by Cæsar. The words *Veni, vidi, vici* have come down to us as an expression of swift and dramatic success.

WHAT DOES THE ORCHESTRA CONDUCTOR DO WITH HIS STICK?

He may be said to collect on the tip of his baton the musical powers of the singers and instrumentalists who have placed themselves under his command. Watch the first raising of the little wand by a good conductor as he is about to launch the performance of some great work. Try to imagine his thrill as he realizes the musical force he is privileged to wield. For the time being every one of those trained musicians has submitted his will to the conductor's. Each is waiting to translate into musical sound his slightest gesture.

The conductor's part, then, is much more than that of a human metronome (the instrument for measuring musical time). The composer sets down the notes to be played or sung. The musicians produce the corresponding musical sounds. The conductor takes these scattered letters of the alphabet and with them weaves the enthralling story which holds his audience spellbound. Yet there is an important mechanical side to his work. Notice that kettle-drum player standing at the back. See how keenly he watches the conductor. He is not playing, but is busy counting the 74 bars' rest allotted to him. Now watch the conductor. He gives a quick glance at the player, to be sure he is prepared for his entry. Then the baton gathers in the brass. The excitement is growing. Suddenly the conductor's left hand shoots out, and the kettle-drums crash in confidently.

So the conductor shepherds the members of his flock—the soprano, alto, tenor and bass singers; and the strings, woodwind, brass and percussion in his orchestra—showing them, not only when, but how, to sing and play.

WHERE DID THE IDEA OF HARLEQUIN COME FROM?

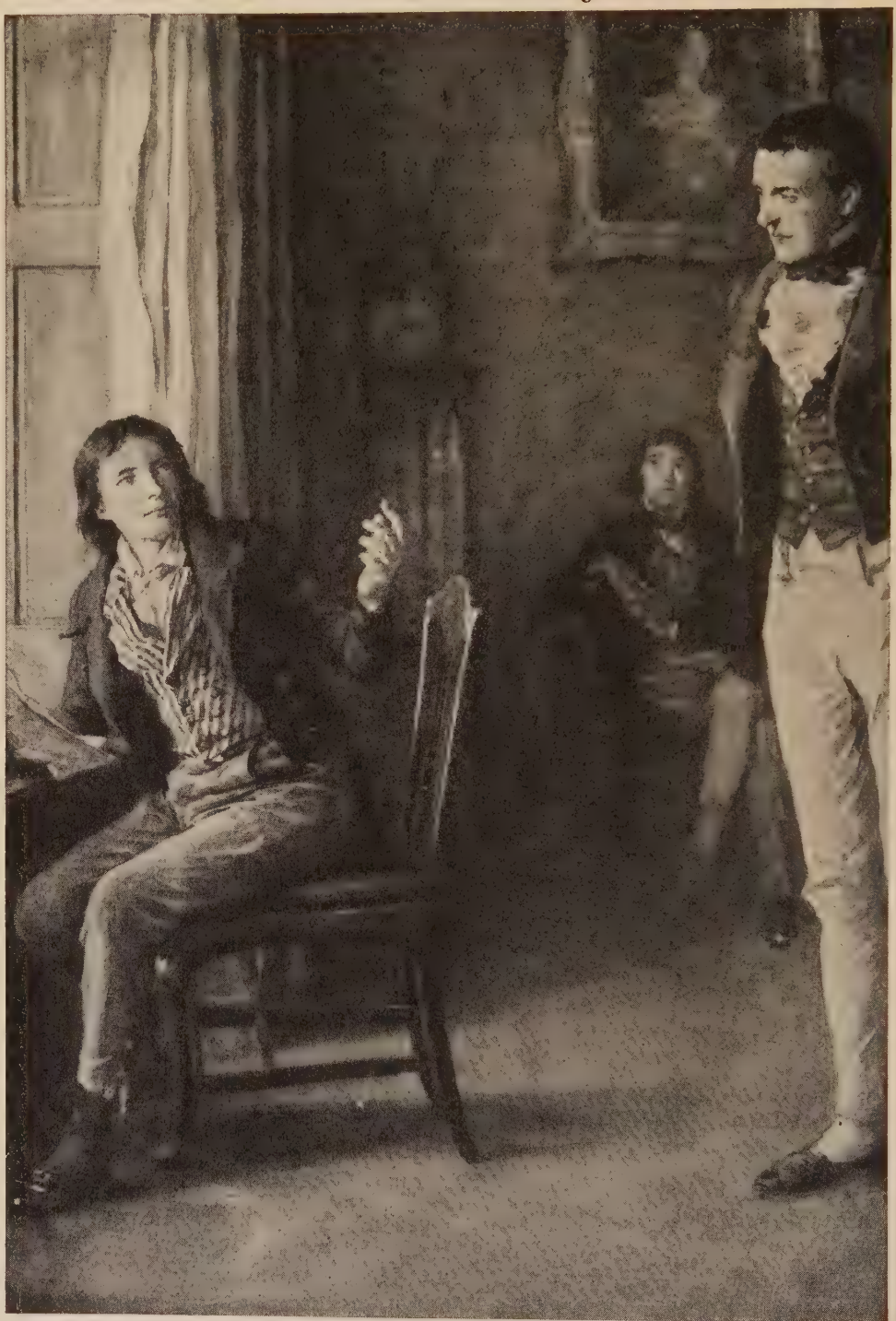
Harlequin was a character in the Italian comedy of the sixteenth century. A slender young man, he wore a motley, tight garment, a black mask, and a leather girdle wound about his waist. He held a long, flat wand, a sort of wooden sabre. There is a romantic legend about Harlequin's costume. It is said that some young students of Bergamo were stirred at the distress of a schoolfellow and too poor themselves to buy him a new suit. They had settled that each would search for all sorts of bits of stuff he might find and bring them in to their friend. This led to a collection of many colors, and the boy was at last clothed in a garment reminding one of a parrot. The costume grew famous at Bergamo, whence it reached the stage, and it has represented ever since the type of the player who first wore it.

WHY MUST A BIG CHIMNEY HAVE SUCH A BROAD BASE?

Factory chimneys are usually built tall in order to provide sufficient draft, or to prevent unpleasant fumes from becoming a nuisance. To give them stability it is necessary to provide for a batter. That is to say, they should be built slightly out of the vertical, so that the weight of the sides should be directed toward the centre. It is generally accepted that all chimneys should have a base at least one-tenth as wide as the chimney is high.

THE NEXT WONDER QUESTIONS ARE ON PAGE 2603,

A THING OF BEAUTY IS A JOY FOREVER



Sitting in his window seat John Keats read out to a friend who shared his rooms a new line he had written "A thing of beauty is a constant joy"; but as his friend was not satisfied, Keats thought again and wrote the famous line, "A thing of beauty is a joy forever." This has become almost a household word.

Byron.

Scott.

Shelley.

BYRON, SCOTT, SHELLEY AND KEATS

CONTINUED FROM 2358

IN the first quarter of the nineteenth century, besides the Lake poets, whose story was told in the last chapter, four other poets were writing in English. Two of them, Sir Walter Scott and Lord Byron, won wide renown while they lived, and the other two, Percy Bysshe Shelley and John Keats, have been gradually given equal or greater honors with the passing of the years.

Sir Walter Scott was born into an older generation than the other three. He was sixteen when Lord Byron was born, twenty-one when Shelley was born, and twenty-four when Keats was born; but he outlived them all, though he was only sixty-one when he died. Looked at broadly as a writer and a man, he is a far greater personality than any other of the three. His life, and his novels, which fill a large place in English literature, are considered in another chapter, so that only his poetry is touched upon here.

Scott began his interest in poetry as a collector of romantic ballads, not as a writer. While acting as a sheriff, he traveled through the Border districts of Scotland, fulfilling legal duties or engaged in country sports, and noted down the songs and ballads gathered into his Minstrelsy of the Scottish Border, which was published in 1802. Before that time he had translated German ballads under the influence of Percy's Reliques of Ancient Poetry, a book that revived in Great Britain an interest in songs and stories that had long ago been popular. It was along this way that Scott arrived at the writing, on his own account, of the romantic narratives in verse which form the great bulk of his poetry. From his tales in verse he passed on to the semi-historical tales in prose by which we know him so well.

Sir Walter's poetry may be divided into three classes—his imitations of ancient ballads, his lyrics, scattered through his prose tales and introduced into his longer poems, and his tales in verse. The lyrics are ringing, manly and romantic, or toned to some sentiment, which may be sad, as in his Highland dirges. The same qualities, more thinly spread, appear in his longer tales in verse, which began with a mixture of vigor and regret in The Lay of the Last Minstrel, published in 1805. They continued with a breezy strength in Marmion (1808), and reached a climax of brightness and sustained interest in The Lady of the Lake (1810). His later poems, however, were all tamer exercises in the same vein, and only lessened his reputation.

Critics who try to narrow the scope of poetry into a few favorite strains that have none of Scott's plain bus-

tling vigor, would almost shut him out from the great company of the poets. But a wide public will always welcome, as did the readers of his own day, his fluent easily understood, robust verse, with its relish of the sentiments that all of us can feel—sentiments of love of one's native land, of wild beauty, of things mellowed by time, of simple love and chivalrous bravery, of gallant pageantry, and regret for the watchfires of the past grown cold to-day. Call Scott's verbal glow rhetoric, if you will, but it is the poetry of vigorous youth, which loves the clatter of galloping away with young Lochinvar.

Lord Byron is to this day the English poet who, on the continent of Europe, ranks next to Shakespeare in popularity. In his own day, he was, for a while, equally popular in Great Britain; and still he has ardent admirers. Of all the English poets he is the most personal. In that he is the complete opposite of Shakespeare. To him, the world and all it contains formed a stage where he could display himself.

THE CLEVER YOUNG MAN WHO LOVED TO WRITE ABOUT HIMSELF

George Gordon Byron, sixth lord Byron, was to himself the very centre of the universe, and almost every poem he wrote proclaimed that fact. The European mind can understand that type of character. It, too, loves to strike a posture before mankind. The average British mind shrinks from such publicity. That is why Byron, the complete egotist, is shunned by many of his own countrymen.

He was a spoiled only son, with a handsome face and clubfeet, and he grew up terribly self-conscious, conceited and scornful. When he was eighteen, his tutor advised him to see more of the world, and he answered him in a poem which reached the utmost limits of self-conceit.

Dear Becher, you tell me to mix with mankind;
I cannot deny such a precept is wise;
But retirement accords with the tone of my mind;
I will not descend to a world I despise.

It would be unkind to quote such a cub-like sentiment were it not that Byron persisted in publishing it himself.

As a youth of nineteen he published a book of verses, Hours of Idleness, including some poems he had had printed privately even earlier. The press saw neither performance nor promise in the book; nor is either visible now. This disappointing reception roused the youth to fierce anger, and he replied in a vigorous but thoroughly unjust imitation of Pope's Dunciad, entitled English Bards and Scotch Reviewers. In it he scratched and bit Scott, Wordsworth, Coleridge and Southey for being regarded as poets when he was not. But the poem proved that Byron had mental vigor, and was an awkward young man to cross.

HOW BYRON WOKE UP ONE MORNING TO FIND HIMSELF FAMOUS

Then he went abroad for two years, traveling in southern Europe, and on his return he published his experiences in two cantos of Childe Harold's Pilgrimage, written in the Spenserian stanza. He, of course, was Childe Harold. The attitude he struck was that of a wicked young man who had traveled through strange but interesting lands and had come back to be alone on the earth.

He had been in countries where most people wanted to go—Portugal, Spain, Greece—and he wrote with ease and vigor. He had seen the lands from which Wellington was now, in 1812, driving Napoleon's French, and wrote such lines as:

The fires of death,
The bale fires flash on high; from rock to rock
Each volley tells that thousands cease to breathe;
Death rides upon the sulphury Siroc,
Red Battle stamps his foot, and nations feel the shock.

He was indeed an interesting young man, though he did write a great deal about himself. The public rushed to buy his book. He, as he himself said, "awoke one morning to find himself famous." He was now twenty-four.

THE SORRY USE THAT BYRON MADE OF HIS GOOD TALENTS

Byron had won his way straight to victory as a writer. How would he use his opportunity? He used it badly. In distant imitation of Scott's romantic tales of history, with their honest chivalry, he wrote tales of Eastern corsairs with loose morals, somebody very much like himself always being the hero—tales that are now dead and deserve to be. And he played the part in London society he had designed for himself, till he even disgusted the frivolous social circle that

gathered round the contemptible Regent, who later became George IV. He married unwisely, lived extravagantly, and in 1816 left England never to return, but leaving behind him two more cantos of Childe Harold, finer than the first two.

For seven years he lived in Europe, chiefly in Italy, writing plays, poems and satires that proved how immensely greater his ability was than could have been foreseen from his earlier writings. Then, in 1823, he set out to redeem his life by doing something worthy. The thing he planned was to fight for the freedom of Greece, that country having risen in rebellion against Turkey. But on April 19, 1824, he died in Greece, at the age of thirty-six.

THE PITY AND TRAGEDY OF A WASTED GENIUS

From the beginning till nearly the end he had been playing a sorry part in living his life, for he had pretended to be a much worse man than he was. He had not been reared to be a real hero, so he posed as a villain-hero. Byron had enough mental power, almost amounting to genius, to be a fine poet, but not enough character to be a great poet, and he ended by being a bitter cynic, immensely clever. There is no greater tragedy in English literature than the contrast between what he chose to be and what he might have been.

For from the poems of Byron, so many of them idle frivolities and so much of them, as in his plays, failure, there can be gathered passages which show that he had great power when he thought so deeply as to forget his almost constant absorption in himself. When he looked outward and saw something worth picturing for all time, he could rise to absolute greatness as long as self-forgetfulness lasted. There are passages in each of the two last cantos of Childe Harold that reach this level. There are equal descriptions in the Hebrew Melodies. There is the scene in Manfred where the Colosseum in Rome is described. There is the lovely description of pure womanhood beginning

> She walks in beauty like the night
> Of cloudless climes and starry skies.

THE POWER AND REALITY OF LORD BYRON AT HIS BEST

And for grim reality, take these two stanzas from Don Juan describing the last scene in a tragic shipwreck.

> Then rose from sea to sky the wild farewell,
> Then shrieked the timid, and stood still the brave,
> Then some leaped overboard with dreadful yell,
> As eager to anticipate their grave.
> And the sea yawned around her like a hell,
> And down she sucked with her the whirling wave
> Like one who grapples with his enemy,
> And strives to strangle him before he die.
>
> And first one universal shriek there rushed
> Louder than the loud ocean, like a crash
> Of echoing thunder; and then all was hushed,
> Save the wild and the remorseless dash
> Of billows; but at intervals there gushed,
> Accompanied with a convulsive splash,
> A solitary shriek, the babbling cry
> Of some strong swimmer in his agony.

Byron was held back by his self-consciousness from ever putting forth his full poetic strength for very long together. Had he done that he would have ranked with the greatest writers of the English tongue in its choicest forms.

Shelley, who was more than four years younger than Byron, had some resemblances to him. He was socially well born, but not happy in his home life; and in spirit, like Byron, he was a natural rebel against authority. That attitude led to his being turned out of Oxford when he was quite a youth. Like Byron, too, he married unhappily, and became a wanderer to and fro about the earth.

THE FINE SPIRIT OF SHELLEY THAT IS REFLECTED IN HIS POEMS

But his was a far finer spirit than Byron's. His worship of liberty led him into excesses in opinion and conduct, but he was not inclined, like Byron, to coarseness. Indeed, his weaknesses came rather from a too fine spirit, unpracticed in the rough and commonplace ways of men.

Shelley's writings were produced abroad after his second marriage, when he had a wife who understood him. He was then only twenty-four. When he was twenty-six he finally left England, and during the next four years produced a succession of poems of great beauty and growing strength—the lyrical drama Prometheus Unbound; the gossamer-like Epipsychidion; the lovely lament for John Keats entitled Adonais; Hellas, another lyrical drama, written in sympathy with Greece struggling for freedom, and ending in the belief that:

> Another Athens shall arise,
> And to remoter time,
> Bequeath, like sunset to the skies,
> The splendor of its prime;

the Hymn to Intellectual Beauty; the lyrics on the Cloud and the Skylark; the Ode to the West Wind, noblest of all his poems, with its magnificent close:

Make me thy lyre, even as the forest is.
What if my leaves are falling like its own!
The tumult of thy mighty harmonies
Shall take from both a deep, autumnal tone,
Sweet though in sadness. Be thou, spirit fierce,
My spirit! Be thou me, impetuous one!
Drive my dead thoughts over the universe
Like withered leaves to quicken a new birth!
And by the incantation of this verse,
Scatter, as from an unextinguished hearth,
Ashes and sparks, my words among mankind!
Be through my lips to unawakened earth
The trumpet of a prophecy! O wind,
If Winter comes can Spring be far behind?

Also the Julian and Maddalo, in which he tells how he and Byron rode and talked together on the Lido outside Venice,

Where 'twas our wont to ride while day went down.
This ride was my delight. I love all waste
And solitary places, where we taste
The pleasure of believing what we see
Is boundless, as we wish our souls to be;
And such was this wide ocean, and this shore
More barren than its billows; and yet more
Than all, with a remembered friend I love
To ride as then I rode; for the winds drove
The living spray along the sunny air
Into our faces; the blue heavens were bare,
Stripped to their depths by the awakening north;
And from the waves sound like delight broke forth
Harmonising with solitude, and sent
Into our hearts aerial merriment,
So, as we rode, we talked.

THE DAYS WHEN BYRON AND SHELLEY LOVED TO ROAM BY THE ADRIATIC

What a picture that is of the two poets amid one of the most beautiful scenes in the world, reveling in their friendship in the days when Shelley, so wild and vague and unrestrained himself, was coming into his manhood. If he could have lived a few years longer, under the wise influence of a sympathetic wife, what might he not have written? For to him were given, in fullest measure, the power of musical song, with ideas that were growing more and more noble, and more and more hopeful. But it might not be.

That scene by the Adriatic recalls a somewhat later scene on the shore of the Mediterranean, where Byron and Leigh Hunt and a rough seafarer named Trelawny were burning the body of Shelley, cast up from a wrecked boat in which he had been sailing. He was only twenty-nine, and his work was done. A sudden squall had quenched the mind that had so musically mourned for Adonais. Of him, as of John Keats, it could be said:

O dream not that the amorous Deep
Will yet restore him to the vital air.
Death feeds on his mute voice and laughs at our despair.

THE GREAT PROMISE OF THE WORK THAT SHELLEY LEFT BEHIND

His friends burned the battered body on the beach and, carrying the ashes to Rome, buried them by the grave of Keats, and so made it doubly a place of pilgrimage.

More certainly than Byron, and as certainly as Keats, Shelley reached his tragic end at a time when every year was adding to the power of his writing and the more even balancing of his judgment. He was shedding rapidly the too great luxuriance of his youthful imagination. He was returning from his dreams to the solid earth and the sobering facts of human existence. In him the world lost a natural champion of liberty who was beginning to value aright the restraints of wisdom. The joyfulness of his youth is a most welcome, though visionary, possession. It is not true of him, as was said, that he "beat in the void his luminous wings in vain." He accomplished enough to show that if he had gone on living he might have ranked as one of our really great poets.

John Keats is to many readers far the most interesting personal figure in the English literary world, if his writing, as it has come to us, is the test. Apart from his writing his sad life was unadventurous. He lived to write.

THE WORK OF KEATS THAT WILL COMPARE WITH MILTON'S

If we wish for a comparison for the swiftly closed career of John Keats we must think what the place of John Milton would have been in literature if he had died when he was twenty-five. Milton would have won but a slender fame for what he had then written. Yet Keats at the same age had written poems which are almost as good as those of Milton in his full powers.

Milton had been reared and educated among all the influences most fitted to develop poetic genius; but John Keats

was born in a London mews, the son of a keeper of a livery stable, who died when the boy was eight. The lad's education was quite ordinary—barely enough to fit him for apprenticeship to a doctor, a career he gave up when he was twenty-two, because he felt that he was born to be a poet and must surrender himself to that master impulse. His instinct was sound. Keats was indeed born to be a poet.

THE YOUNG GENIUS WHOSE POEMS WERE OVERWHELMED WITH SCORN

He was twenty-one when his first volume of verse was published, in 1817. No first book by a young man ever more clearly foreshadowed greatness. Yet it was reviewed with savage scorn by one of the publications which then was supposed to stand for skillful criticism. It has been suggested that The Quarterly Review killed John Keats. There is no ground for this. Already he had within him the seeds of the disease of which he died four years later; and he was a sensible man who knew why he was attacked.

All the poets of that period, except Scott, either had been or were enthusiastic friends of modern freedom. They saw in the French Revolution a movement for the relief of mankind from the burdens of tyrannical government. Wordsworth, Coleridge and Southey had had that vision. But the violence of the revolutionists disgusted them.

When, however, the new generation of poets—Byron, Shelley and Keats—was reaching manhood, the Revolution had passed, and the blind tyrannies of Russia, Austria and Prussia were fastening chains afresh on the European nations, and only England had any sort of freedom. In these circumstances it was natural again that the poets should sing the songs of freedom. That is what Byron did in a measure, and Shelley with impassioned enthusiasm, while Keats belonged to their circle, though he was never political in his verse.

THE JOURNALIST WHO SAID WHAT HE THOUGHT OF A BAD KING

All these poets, and particularly Keats, were friends of Leigh Hunt, a London journalist of that day who was imprisoned for writing disrespectfully of the most unkingly man that ever wore the British crown—George IV. So the part of the press that backed up these reestablished tyrannies was sure to see an enemy in the young poet whom Leigh Hunt praised and who dared to praise Leigh Hunt. That accounts for the viciousness of the attacks made on Keats when he ventured to publish a modest book of verse.

So it came about that many people who could afford to buy books did not buy the poems of John Keats. They were warned off from them. Still he went on writing, and in 1818 published another volume, Endymion, picturing man's search for beauty. In 1820 a third volume appeared, containing a splendid fragment of what might have grown into one of the world's greatest poems. This he called Hyperion. It showed him as a poet of massive imagination, not unlike Milton.

Nobody could now deny that Keats was a poet of most delightful charm with promise of fine power. But he was dying. Travel in search of health was unavailing. He died in Rome on February 23, 1821, and is buried there in the Protestant Cemetery, where Byron afterward buried Shelley's ashes.

THE RARE BEAUTY AND DELICACY OF KEATS, THE POET'S POET

In his earlier work, Endymion, Keats, as might be expected from his youth, had a too luxurious imagination. He had not sufficient definiteness of thought, and his aim is not always easy to follow, but already he had an exquisite feeling for the music of fitly chosen words.

As he gained strength and confidence he produced poetry that appeals irresistibly to the poetical mind. No writer has had a greater influence on true poetry than he. His odes on Autumn, A Grecian Urn and The Nightingale, and some of his sonnets, must appear in every collection of English verse. He could suggest an atmosphere, as of a picture, with wonderful delicacy and reserve, as in his fragmentary Eve of St. Mark, and the weirdly fanciful *La Belle Dame Sans Merci.*

Even more than Spenser, John Keats is the poet's poet. To the poet, as Shelley sang,

> The soul of Adonais, like a star,
> Beacons from the abode where the Eternal are.

In his youthful writings English poetry was refined to a rare purity, and he had a reserve of imagination which suggests a very great loss to our literature through his untimely fate.

THE NEXT STORY OF LITERATURE IS ON PAGE 2625.

Strathcona II, the hospital ship fitted up to be used as the successor to the original Strathcona, which was the gift of Lord Strathcona, is 84 feet long and 16 feet wide. She will carry a sail, and is fitted for oil instead of coal heating. The hospital ship plays an important part in the work on this coast.

Have you a journey to go, or firewood to haul, or supplies to bring from a distance? From November until May in Labrador and northern Newfoundland, you can do none of these things without a trusty dog-team. Feed them well, treat them kindly but firmly, then give each his place at the end of his trace and they will sweep your sled over the snow. Here, a summer helper is feeding dogs at Forteau.

Photos, courtesy of the Grenfell Association of America.

A bit of Labrador coast at Battle Harbor.

A FRIEND TO FISHER FOLK

DR. WILFRED THOMASON GRENFELL

CONTINUED FROM 2340

ABOUT fifty years before the World War a little boy ran barefoot along the Sands of Dee, visiting among the fishing-boats in the river mouth, wandering across the marshes, hunting the game birds there, learning to know the ways of nature at first hand. His name was Wilfred Thomason Grenfell, and he lived in the old city of Chester, which had been built hundreds and hundreds of years before by the Romans.

Chester is in the western part of England, beside the river Dee, and only the river lies between it and Wales. There Wilfred and his brothers spent their childhood. Some of his great-grandfathers, in the exciting days of England's earlier kings and queens, had sailed the seas to defend the land from Spanish fleets. And other relatives, not so long before, had fought in India for British honor and glory. So this little lad, with the fearlessness and hardiness of a good soldier or a good sailor, faced discomfort without flinching and loved hard sport or adventure. Even when he was a very little boy, the storms and gales and tides sweeping across the river's mouth taught him the dangers of the sea and the hardships of men who live in boats. Yet he never felt any terror of such a life; and a great part of his own manhood has been spent on rough waters where boats are often tossed about like playthings of the waves.

THE EARLY LIFE OF A HEALTHY ENGLISH BOY

Until he was fourteen years old Wilfred lived and studied in the school kept by his father, who was a very learned man as well as a generous and kind parent. For his mother the boy had great love and devotion. This is the tribute he has given in writing the story of his life: "My mother was my ideal of goodness. I have never known her speak an angry or unkind word. Sitting here looking back over fifty years of life, I cannot pick out one thing to criticize in my mother."

From home the lad was sent to Marlborough, a large university preparatory school, where he spent several years in work and play, boyish pranks and changing "hobbies." Every boy makes collections of some sort. Wilfred and one of his brothers col-

lected birds, seaweeds, shells and flowers, making their own cases and mounting their own specimens. Wilfred's great specialties were butterflies and moths, while his brother's chief interest was in birds' eggs. The brothers were in different schools, but the holidays were spent at home together, sometimes with the added company of cousins and friends. When the time came for choosing his real work in the world, Wilfred, then a young man, began to study medicine in London.

Always fond of stiff physical exercise, the young medical student joined gladly in the athletic life of his university—cricket, football, rowing and hammer-throwing. All his life his enjoyment in active outdoor sports has been keen. Soon he found a new way of using his strength and his fine enthusiasm. When his honest, fair-dealing mind faced the question of what religion ought to mean to him, he decided that the life of Jesus Christ held out the best answer. This he would take as a guide for his own actions. Instead of a habit religion then became for him "the real adventure of life." Without any thought of sacrifice or hardship for himself, he simply looked about to find some helpful use for the sort of things he could do. Before long he had started giving some of the street boys of London in his Sunday-school class a chance at athletic exercises. Then he found a way to take groups of them with him and his friends on the boating and camping trips that were his principal holiday recreation. There they learned to swim and to enjoy a simple life in the open. It was before the days of Boy Scouts and other such organizations.

THE YOUNG DOCTOR FINDS HIS LIFE-WORK AMONG THE FISHERMEN

In 1886, after passing his examinations, young Dr. Grenfell was asked to join in a new work for deep-sea fishermen on the North Sea. These men, living on their boats, were exposed to great dangers and had little interest in their lives outside of the day's task. They were only too likely to spend their free time—and their money—in drinking on the grog boats that went along to sell them alcoholic liquors, or in low saloons on shore.

The plan for the new venture, the Mission to Deep-Sea Fishermen, was to fit out a fishing-smack and send it among the fleets to offer the fishermen the services of a good doctor in case of accident or sickness. Then, too, they might find friendly companionship with the little company on board, and attempt simple religious services there.

You shall hear, in his own words, Dr. Grenfell's impression of his new experience. "These deep-sea fisheries," he says, "were a revelation to me, and every hour of the long trip I enjoyed. It was amazing to me to find over twenty thousand men and boys afloat—the merriest, cheerfullest lot which I have ever met. They were hail-fellow-well-met with every one, and never thought of deprivation or danger. . . . They were the nearest possible thing to a community of big boys, only needing a leader."

The work suited the young man, and he was just the one to fit the work. Life at sea gave him a chance to know the men and give them the understanding fellowship that they needed. A good fighter, too, when a fight is necessary, he showed his spirit in getting the better of the forces that worked against the welfare of his fisher friends. His nature delighted in the free, hardy ways of seafaring and in the direct approach of man to man. He had never "cared much for the frills of life," he tells us, so he did not feel the lack of them. Added to a wish to do what he could to make men whole and well in body, he had a deep purpose to help them become strong and splendid in every way. His straightforward Christian thinking and Christian living were just what would appeal to men who lived simply and saw things naturally. In fact, this sincere, cheery, hearty, athletic, fun-loving missionary doctor found his way straight into the hearts of men and boys wherever he went.

LIFE ON THE BLEAK COAST OF LABRADOR

The North Sea work had been going on for about five years, and growing all that time, when the way opened for a new and joyful adventure. At least that is what it seemed to Dr. Grenfell. He was asked to go across the Atlantic Ocean and carry to the fishermen of the cold seas along the western shores the same kind of help that he had been giving on the European side. It was the beginning of his own special life-work. Far-off Labrador did not know what a

happy day for its future had dawned one morning in June of 1892. Perhaps that very day some child was born whose life would later be made full of health and usefulness through the doctor just starting from England to cross the ocean to find the children who needed him. Perhaps that very day some child or man or woman in Labrador was dying in pain and want because there was no doctor, no help, no comfort to be had.

For it was a land of hard conditions, where every mouthful of food must be won by heavy labor, and even the children must begin early to help at the tasks of catching, splitting and curing codfish, and working in the household. Grains will not grow there, so all cereal food has to be brought from a distance and bought with a price. Few vegetables can be raised because of the short, cool summer season. And, besides, the strong wolf-like dogs that are so necessary for drawing loads destroy any attempt at a garden if they can break into it. Neither will they leave pigs or sheep or hens alive. They really make it impossible to keep such live stock even if there were food for raising it. The sea is the source of most of the food for the inhabitants. Cod serves them for "bread and butter," we are told. There are Indians (busy in hunting deer and trapping fur-bearing animals), Eskimos, and descendants of British settlers who in one way or another drifted into these desolate ports. The last are called "liveyeres" because they say, "Oh, ay, zur, I lives yere!"

Dr. Wilfred Thomason Grenfell.

THE HARDSHIPS AND POVERTY OF THE FISHER FOLK

Across the ocean, then, Dr. Grenfell sailed, following the course that John Cabot had taken four hundred years earlier, and landed in St. John's harbor, Newfoundland. From there he started again on a long northern cruise in Labrador waters and along the coast. What he saw you must read some day in his book, A Labrador Doctor. Oddly shaped towering icebergs, a hundred or more at a time, flashed rainbow colors across blue seas, where shoals of fish made silver streaks, and "great schools of whales, noisily slapping the calm surface of the sea with their huge tails as in an *abandon* of joy, dived and rose." Fiords, or high-cliffed inlets, wound in among the mountains. Birds and berries were some of them strange and some of them familiar. Bare giant jagged rocks were contrasted with deep growths of evergreen in river valleys. The air was full of life and sparkle.

And how about the people? They had no crowded cities, no large settlements even. Here and there were small groups of those who lived the year round on the Labrador coast, making a bare living by fishing, hunting and trapping. They must work very hard indeed in the summer fishing season to get enough fish to exchange for their winter food and clothes. If they had bad fortune in the fishing, they often nearly starved (sometimes actually starved) before the springtime came.

In winter they might catch fur-bearing animals whose pelts could be sold for supplies, but long, hard journeys by komatik (dog-sled) had to be taken to the nearest trading-posts to make the exchange. Seals must be killed to provide fat and food and skins for clothing. In fact, they were greatly needed for all three. For example, no other material than sealskin will make shoes that properly protect the feet from Arctic cold. But in later years the poor folk of the coasts have had greater difficulty getting

seals enough, since great sealing parties, in large, strong vessels, despoil the seas each spring, carrying off the skins and leaving behind great waste of flesh that should have served for food.

THE GENEROSITY AND SELF-SACRIFICE COMMON IN THE NORTH

There is no ease for the dwellers in the Labrador. But they are a sturdy, cheerful, friendly sort of folk, ready to bear the burdens of life as they know it, and generous in sharing whatever they have. The flour may be low in the barrel, with no more to be had, and there may be left but a few drops of "the sweetness" (molasses); still, a needy neighbor or a chance visitor is welcome to take the best of what there is. Flour mixed with water and then fried, a little molasses, and a drink of tea, is not very good fare for hard workers in a cold country; but this sometimes has to serve for whole families part of the winter. The homes that the doctor found were dark, damp and uncomfortable. A whole family might be living in one room, with wooden bunks around the walls to sleep upon.

Sickness or injury under such conditions would bring the worst results. If a bone were broken or a gun explosion made a bad wound, there was no surgeon at hand to help. If illness came, there was no chance for medicine or good food and nursing. Sick folk "simply died or lived, as chance directed." Besides the families that make their homes entirely in the region, through the short summer season there is a larger floating population of fisher folk from farther south, who either live on their boats or come by the mail-boats and camp on the shores while they catch their fish and dry and salt them. They, too, often need a doctor's attention.

HOW THE WORK HAS GROWN AS THE YEARS HAVE PASSED

"Be you a real doctor?" was the question that greeted the newcomer on the Mission boat. "Us hasn't got no money, but there's a very sick man ashore, if so be you'd come and see him." About nine hundred patients Dr. Grenfell treated that first summer, and never since that time have the people had to go through a year without visits from skillful physicians with friendly hearts and hands. Indeed, they are inclined to think that any stranger must be a doctor. For year by year the work has grown. The second summer a little hospital was started at Battle Harbor, on an island at the entrance to the Strait of Belle Isle, just between Labrador and the northern point of Newfoundland. Then another was added, for summer use, farther up the coast, at Indian Harbor. In the first years Dr. Grenfell alone made the rounds in a little launch with only three men. A fearless and able seaman, he shared the watches on board, even when tired by long service among his patients.

But to reach more people and reach them more often there had to be more workers. Dr. Grenfell's own eager interest and belief in the future of Labrador led friendly helpers from England, Canada and the United States to offer their time, and others to send their money. The doctor found that by spending his winters lecturing and writing he could gain this useful help. The result is that there are several hospitals, with the best of doctors and kind nurses, ready to care for the folk on the bleak northern end of Newfoundland and the long Labrador coast. As long as the summer keeps the water open, boats carry workers north to far-away points where, before, only the Moravian Brothers had done anything to help. They had been very good friends to the Eskimos there.

HOW THE DOCTORS OF THE MISSION MAKE THEIR DANGEROUS ROUNDS

The Strathcona, Dr. Grenfell's hospital ship, presented by Lord Strathcona, was sunk in 1923; but soon a successor, of the same name, was fitted to take up the work. Other smaller sailing-boats and launches go here and there, manned mostly by students who love to spend their vacations in this way. In the winter, journeys have to be made on dog-sleds over scrubby, snow-covered ground where it is not easy to find one's way, or over humpy ice in bays and alongshore. But away go the doctors, in clothes made to keep the heat in, and with "lassy pork buns" in their "nonny bags." These buns, made with molasses and containing chopped pork fat, are good, nourishing food and do not freeze. "Lassy seal buns" are made with seal blubber instead of pork. More than once have Dr. Grenfell and his assistants nearly lost their lives on their trips.

SUMMER TIME ALONG THE LABRADOR

Many of the fishermen who move north for the short summer fishing season in Labrador waters live on their boats. Others live in such shelters as this low sod house—close, dark and damp—where diseases are unwelcome housemates. Their fish are spread on "stages" like the one at the left.

This picture gives a nearer view of a summer fish stage. Much depends upon the number of fish that may be caught and spread upon the stage to dry during the short summer season. Some of them must be kept for winter use and some exchanged for other kinds of food. In a poor fishing season there is great danger that the family will go hungry.

Once he spent the night on a loose ice-pan, and had to kill three of his good dogs to wrap himself in their skins.

A little story will show how much more than just physicians these doctor-friends are. In a remote hamlet where the winter was a bad one, the children were looking for Christmas cheer to come somehow, for they had been told by an old man, "Why, if Santa Claus is to get to Noo Yawk on time, he'm obliged to pass here early."

At the very right minute one of the doctors dashed up on his dog-sled. "Come right in quick, Doctor," said the old man. "We're just looking for Santa Claus, and I don't know but what you's him."

THE PEOPLE ARE TAUGHT TO HELP THEMSELVES

The centre of the work is now at St. Anthony, on the northeast point of Newfoundland. A fine little hospital, a home for orphan children, a good school, an industrial house with carpenter and machine shops and other useful training departments—these are some of the things you would find at St. Anthony, once a wretched little settlement. The doctor's house stands on the hill. There his wife, his best helper, and his three children live. Near by there is a guest house for visiting workers to live in. Children from the home have been sent to study at Pratt Institute, New York (where they have a scholarship), and to other places; then they have gone back to put their new training into use. They, with the help of volunteer workers, have brought about great changes in St. Anthony. Some of the buildings have steam heat. There are, too, an electric plant for lighting and other uses, and a water reservoir with unfreezing pipe supply for the houses. These things meant hard, hard work in that rocky land.

So far has the fame of the hospital spread that the mail-boats bring sometimes fifty patients at a time. As Dr. Grenfell said once, sometimes "the little waiting-room . . . at night resembled nothing so much as a newly opened sardine tin." The greatest of specialists often make long trips to give their best services to the sufferers of the sub-Arctic region. Eyes and ears and throats and bones can have as expert treatment as could be obtained in a great city. Here is a letter from a would-be patient:

"Dear Dr. Grenfell, when is the eye spider coming to St. Anthony? I needs to see him bad."

CO-OPERATIVE STORES, A SAWMILL, AND MILK FOR GROWING CHILDREN

One of the most helpful changes made by Dr. Grenfell's efforts is the system of co-operative stores which has taken the place of the old plan of "trucking" in the trading places. By that plan a family's whole catch of fish or furs would be passed over to the trader in exchange for provisions. In bad seasons the supply would be advanced, to be paid for by a future catch. Thus a debt was formed that sometimes was passed along from father to son. The new stores have been built up by the people themselves, urged and assisted by Dr. Grenfell. Shares are owned by the members, payments are in cash, and often there are profits to be divided. Of seven or eight such stores, most have been very successful.

In one place a sawmill has given the people a new way of improving their condition. One by one the good changes have come about. One great need—that of animals to provide milk for children and for those who are ill or weak—has been found to be best met by importing goats. These hardy little animals, having no need of rich pastures, can live in rocky places, and their milk is very nourishing. The fathers and mothers of Labrador who are able to have goats to supply the right kind of food for their babies are happy in seeing them grow up plump and healthy-looking.

LIBRARIES HELP TO DISPEL THE MONOTONY OF THE LONG WINTER

One other kind of help that has been started in those far-scattered settlements is the distribution of books. Again St. Anthony is the central point. Visiting librarians have given time to planning the collection and arrangement of the books. Boxes of fifty or a hundred volumes are carried out on the Mission boats, to be dropped at different points and picked up the following year. They are heartily welcomed.

Although he has not sought rewards and honors, honors have come to the modest doctor of the Labrador. Several universities in England and America have given him degrees, and it was with the Harvard Surgical Unit that he served in France during the World War.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 2583.

Kangaroos in motion and at attention.

THE KANGAROOS AND THEIR KIN

CONTINUED FROM 2400

IN Eastern stories rivals for fortune and happiness go forth with different gifts and equipment to gain certain objects. Nature also sends forth her children with curiously varying powers. The alligator and the ostrich crawl from the egg able to begin life at once. Some forms of life go through amazing changes, as is seen in the tadpole or the caterpillar. Other creatures, like the newborn mouse, begin their existence blind and helpless but with the instinct and power to draw nourishment from the mother. But all baby mammals are not able to do even as much as that.

The great Order to which our story has now brought us, the kangaroos and their kin, is born more feeble and helpless still. The young are produced in such an early stage of existence that they remind us of what chicks would be if they left the egg many days too early.

They cannot even suck, and would die in a few hours were it not that nearly all these animals have pouches that serve as cradles. Into these the young are popped the moment they are born. Safe and snug they continue the growth which a bird or reptile makes in its shell. Too weak to suck, the little one receives into its mouth a teat which passes down into the stomach. The baby's mouth is hardly a mouth at all in the early stage of life, but a cylinder down which the teat is thrust. The milk is not obtained by suction, but is forced down by the muscles of the mother, much as water is forced into the stomach of a thirsting camel from its storage cells.

Even this provision is not sufficient to safeguard the feeble sprig of life. The milk might enter the little lungs. So, at the outset, there is no communication between the nostrils and the mouth. Breath passes straight to the lungs from the nostrils, which do not open into the mouth until the baby is old enough to begin sucking on its own account, and so to regulate its intake of food. This arrangement of breathing for the baby stage matches that which is found in the crocodiles and the whales. Nature safeguards infant animal life.

The receptacle in which the little ones are placed at birth is called a *marsupium,* from the Latin word for "pouch." Pouched animals are therefore called Marsupials, though not quite all marsupials are pouched. They all have the habit of producing young in a very immature condition, but in some the young have to cling to the mother's fur; in others they hang buried in the woolly undercoat.

The marsupials are a very numerous group, but all the members of it are confined to the Australian regions, save the opossums of Central and South America, with one species ranging into the United States.

THE AMAZING CREATURES TO WHICH NATURE GAVE A CONTINENT

Why should these animals differ from all others in the manner of their birth? There are two theories. One is that the whole group has fallen out of the race and has gone backward or degenerated. The more generally accepted belief is that the marsupials are unchanged examples of a primitive type of animal.

The marsupials, it is supposed, reached Australia when that continent was linked by land to other continents. There were few animals there and they have remained unchanged in a land which was cut off from the outer world.

The marsupial's brain is sufficient proof of its condition. The Order has bulk and speed, with ferocity here and there; but in the whole assembly there is hardly a brain worth mentioning. The need has apparently not been experienced. They had a domain of three million square miles where civilized men are new-comers, and savages date back only a few thousand years.

THE AUSTRALIAN COUSINS OF OUR RABBITS, MICE AND CATS

Clearly, marsupials take the place in Australia of other kinds of animals in the rest of the world. The kangaroos stand for our great vegetable feeders the deer, antelopes and cattle. There are tree-climbing marsupials like Old World monkeys, and animals whose tails grip like those of the New World monkeys. There are marsupials whose lives are passed among the rocks; others that burrow like mole and badger; others that come as near to flying as to parachute. Some live entirely on flesh, some on insects. There are wolf-like forms, cat-like animals, rat-like, mole-like, bear-like, rabbit-like, mice-like; there are marsupials that have taken to the water. Some tower above tall men; some are as small as field-mice.

At the head of this great army stand the kangaroos, with which are the kangaroos proper, the wallabies and the kangaroo rats. The distinction of this brigade is that they have forsaken or never acquired the all-fours method of travel and have become the greatest of leapers. The fore limbs are small and have no part in movement except when the animal is passing from one patch of food to another. Then it may crawl along clumsily.

THE KANGAROO, WHICH GOES THIRTY FEET AT A BOUND

The hind limbs, very long and composed of bone as dense and splendid as ivory, are very strong. The kangaroo does not run: it leaps and bounds twenty and thirty feet at a time at an enormous speed. When at rest it balances itself on its hind legs and its great tail as on a tripod. But contrary to common belief, the tail is not used in flight, except perhaps as balance and rudder. The leap is not helped by this organ, which is carried clear of the ground.

The head of the kangaroo is small and unintelligent, yet attractive, mainly owing to the fine, gentle eyes. The teeth are peculiar, for the front of the lower jaw is not a solid, undivided bone like the jaw of other mammals. The front of the jaw is divided in the middle, and the two halves can move to some extent independently, like the lower jaw of a snake. The result is that the two centre cutting teeth work one against the other, like scissors.

It is this peculiarity which makes the kangaroo so dreaded by farmers. Not only does a big Gray Kangaroo eat as much as two sheep; but by this unique action of the teeth it roots up, as well as eats, the grass, and leaves a pasture bare earth. This fact, coupled with the value of its skin for leather and of its hair for felt hats, has caused the animal to be hunted vigorously. Once there were millions of them, but they are now growing scarcer and scarcer near all settlements. Soon Australia will have to establish reserves to save from extinction one of the strangest animals in the world.

We hear much about the height of giant kangaroos. The actual giants were all dead ages ago. The fossils in the rocks show that once there were giant kangaroos and wombats as huge as rhinoceroses. These have gone the way of nearly all other animals of great size. Still, a gray kangaroo which at one moment is cowering among the scrub unseen, like a browsing antelope, suddenly raises itself to its full height of seven feet and more by standing on the toes of its powerful hind legs.

Generally the kangaroo is inoffensive enough, though at close quarters it can strike trenchant blows with its hind feet, poising itself on its tail to do so. With all its feeble brain, it has instinctive cunning enough, when pursued, to take shelter in four or five feet of water, and there use its fore feet as hands to hold down and drown the dogs which attack it.

The young kangaroo which is to grow into a giant of seven feet and weigh 200 pounds or more, appears as a mite of life only an inch or two in length, hairless, barely formed, with skin so thin and fragile that its veins are all revealed. The mother nurtures it in her pouch, and it continues to grow there as a chick grows within the egg. For months she carries the little one in that strangest of nests. The babe becomes a perky, fully equipped kangaroo, peeping cheekily from its cozy hiding, popping out to be taught to crop grass, and popping back the moment it is tired, lazy or afraid.

The Yellow Woolly Opossum.

The Quica Opossum.

Until it weighs four or five pounds the baby is borne about in this way. Pursued by enemies, the mother will leap away on far flight, sustaining the burden securely in that wonderful little home. When her strength can no longer endure the double strain, she will thrust the little one out. While it scuttles away in one direction she will lead the hunt in the opposite path, but will return later, if alive, to recover her furry treasure. Great affection is manifested between parent and offspring. But kangaroos and wallabies are naturally friendly and good-natured creatures, except at certain seasons, when the males fight.

The Wallabies, so named by Australian natives, are like smaller kangaroos. While the kangaroos prefer open grass land, the wallabies are at home in scrub and among rocks, and make their living on roots rather than grass. The Red-necked Wallaby is over forty inches long, with a tail of nearly a yard, but there are wallabies as small as rabbits, and one so closely resembles the cousin of the rabbit that it is called the Hare Wallaby. The rock wallabies number several species, and make amiable pets.

The Spur-tailed Wallabies are the only animals, with the exception of the lion, to possess a horny, nail-like spur at the extremity of the tail; its purpose is unknown to us here, as in the king of beasts. Tree kangaroos follow the life which their name suggests, and are very different from other members of the family. Their limbs are nearly even in size. Though they have acquired tree-haunting habits, they are extraordinarily slow climbers.

Let us pass to the Kangaroo Rats. Shall we say that they seem to be rats which have assumed a kangaroo form, or kangaroos which have assumed the outline of the rat? Neither is quite right, but the choice is open. The largest of the species has a body fifteen inches long; the brush-tailed kind have sufficient gripping power in the tail to employ its tip to carry bundles of fodder for food and nesting material; but all are hairy-tailed. They are less efficient leapers than the kangaroos, owing to the narrowness of the hind feet, and the front limbs seem to play a part in the motion of the animals. The animal we call a kangaroo rat in this country belongs to the rodents, not to the marsupials.

THE MUSK KANGAROO WHICH LOOKS LIKE A LINK WITH THE MONKEYS

A curious puzzle is the rat-like Musk Kangaroo. Some of its features are clearly kangaroo, but others link it with the Kangaroo Rat and the Cuscus, showing us how the various groups are related. Still, it is a surprise to the novice to jump from Kangaroos to the Phalangers. This is a large, strange assemblage of animals which includes the Cuscuses, the Australian Opossums, some squirrel-like animals, and what Australians proudly call their "bear." Nevertheless, science finds no difficulty in the classification, thanks to the clues afforded by the musk kangaroo.

All the members of the phalanger group to which we now come, are remarkable for thick woolly fur and for the presence of a sort of nailless thumb on the hind foot. Several species have the monkey's art of clasping with the tip of the tail. And it is here that we find the parachutists.

The long-snouted phalanger heads the procession—a neat little creature with a muzzle curiously suggesting our own shrew. Like that animal, it is an insect-eater, and collects its prey by means of a long, slender, pointed tongue, resembling that of a true ant-eater. It is a West Australian product, unknown elsewhere. Phalangers, like cuscuses, are pouched animals, but the cuscuses resemble herb-eating cats, or opossums. Their fur is dense, and in some cases very handsome, notably in the spotted variety. The tail will cling to a branch even when the animal is dead. Cuscuses eat leaves, live in holes in trees, climb, are slothful and dull, but resist injury incredibly. Indeed, that is a characteristic of all of this Order. A kangaroo will survive two broken legs and a chest lacerated by shot; a cuscus will live with its spine broken, and for hours with its brain riddled.

THE LITTLE FLYING OPOSSUM LIKE A SQUIRREL TWO INCHES LONG

The Australian opossums resemble the cuscuses, but, though the tails of those animals are naked at the end, the opossum's tail is thickly haired almost to the tip. One species of opossum inhabits forests, another keeps to low scrub. Both eat leaves with an occasional addition of flesh food, but the opossums are as agile as the cuscuses are slow.

Here are the flying representatives of the great continent. Like our early aeronauts, they have attained the gliding stage, but lack the power which wings can give. Still, their feats are wonderful. The largest of the parachutists is the Taguan Flying Opossum, twenty inches long from the nose to the root of the tail. From that size down to a delightful little creature of only two inches, the Pigmy Flying Opossum, the group singularly resembles the flying squirrels of the Old World, and displays varying grades of efficiency. The manner and the means are the same. They have the usual stretch of membrane opening and closing as the animals launch themselves from a height.

The achievements of the Flying-squirrel Opossum are notable. It is a fact that the savage Australian native's wonderful boomerang gave us the true outline for an airplane propeller. These animals reveal to the ambitious airman the ideal method of effecting a landing. After a great swoop from a stately tree, the little wonder, as it nears the ground, takes a momentary upward turn immediately before alighting, and so breaks the force of what might be a fatal crash.

THE WONDERFUL PARACHUTIST WITHOUT A PARACHUTE

But is not Leadbeater's Opossum, after all, the most interesting of the group? It is a parachutist without a parachute! Six inches long, known only in Victoria, this little animal performs its aerial leaps and swoops and dives with nothing but four limbs and an unshakable nerve to sustain it. The leaps and dives are there, but no implement for them.

GIANTS THAT DIED, AND THE PIGMIES THEY LEFT BEHIND THEM

It is curious that the giants of this group should all have passed away, and that tiny animals like the pen-tailed, the pigmy, and other minute forms should still be boldly claiming their place in the land. One of them is a creature marked by a plume of hair on its tail resembling the vanes of feather on a quill pen. Another is a midget which resembles a dormouse, but is really a marsupial going by the name of the Dormouse Opossum. It is a dormouse in general appearance and habits, but has a curious tail which is hairy for half its length, then naked and scaly, and as good as an extra hand.

Next comes the Koala, which white men call the Australian Bear. It is a pouched mammal related both to the

KANGAROOS AND THEIR COUSINS

A BENNETT'S WALLABY AND HER BABY

THE RED KANGAROO

ANTELOPINE KANGAROOS, RARE ANIMALS OF NORTH AUSTRALIA

THE BLACK WALLABY IN ITS NATIVE SCRUB

PARRY'S WALLABY

THE BRUSH-TAILED WALLABY

THE TASMANIAN DEVIL

THE WATER OPOSSUM, OR YAPOCK

THE RABBIT-EARED BANDICOOT

THE TASMANIAN WOLF

KANGAROOS LEAPING AWAY IN ALARM

THE BRIDLED WALLABY

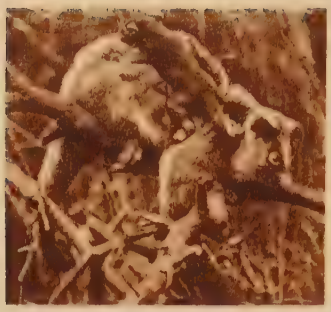
OWEN'S KANGAROO

THE WOMBAT

THE SPOTTED NATIVE CAT, OR DASYURE

THE SHORT-TAILED WALLABY

THE GREAT KANGAROO



AUSTRALIAN RING-TAILED OPOSSUM

AN AMERICAN OPOSSUM WITH HER FAMILY

THE SPOTTED CUSCUS

THE TREE KANGAROO

THE KOALA

THE AUSTRALIAN OPOSSUM AT REST, AND CLIMBING A TREE

The pictures on these pages are reproduced by courtesy of Messrs. Gambier Bolton, F. W. Bond, C. Grant-Lane J. J. Ward, the American Museum of Natural History, and others.

opossums and the wombats. With its sharp claws it is entirely devoted to life in the trees, which it climbs with a steady deliberation suggesting that to-morrow will always do.

THE WOMBAT WHICH HAS MADE ITS HOME UNDER THE GROUND

Next to the koala, and its closest relatives on the side farther from the opossums, come the Wombats. Their powerful build and flat-footed, shuffling gait suggest the bear, though their front teeth are unmistakably on the pattern of the rodents. With all their power of jaw, they have taken to a subterranean life, like the badger and fox. Down where they burrow they must often find the bones of the Goliaths of their tribe—beasts which are no more.

The Bandicoots are flesh-eating Australians which do great damage to crops because their diet is as general as a rat's. Hated, with good reason, by the farmers whom they pillage, the bandicoots are interesting to naturalists by reason of their curious structure. They are not related to kangaroos, yet they have the hind limbs of kangaroos, combined with the long, flexible snout of the insectivore. The common species, about sixteen inches long, with an extra four-inch tail, have ears long enough to reach the eyes when they are turned forward.

THE QUEER TASMANIAN COUSINS OF THE BADGER AND THE WOLF

If these are hated for their habits, what shall we say of the true flesh-eaters, the Tasmanian Wolf and the Tasmanian Devil? The first looks a sort of nightmare wolf, but it is striped with dark bars across the back, and the body merges imperceptibly in the tail. Its home is Tasmania; its lair is a dark cave or cleft in the rocks; its habits are those of our own wolves, reinforced with a tincture of peculiar savagery. It seems to be the Caliban of the wolf tribe, making up in ferocity and blank savagery what it lacks in the refined cunning of the true wolf. Like other marsupials, it carries its young in a pouch, and the whimper of the baby in that furry cradle has sounded in the ears of many a sheep as it has fallen a helpless victim to the fangs of the mother.

The Tasmanian Devil is the badger with a Fury's temper. In size and gait it is somewhat smaller than our badger, but in practice it has something of the marten's love of slaughter, something of the strength of the bear for its feats in search of food. Very powerfully built, with an immense head and formidable jaws, it attacks any animal which it deems itself capable of killing, especially sheep. Its home is in rocky places or in burrows sunk at the roots of trees by its mighty claws.

SOME OTHER QUEER AUSTRALIAN MARSUPIALS

Returning to the mainland, we have to make our bow to Australia's native cats. There are several species, of which the largest equals the size of our ordinary domesticated cat. They are all spotted with white, and one species is unique in having even the tail decorated in this fashion. All are tree-dwellers, and Australia's cats seem to take the place in the continent's life-scheme not of our cats, but of our martens.

The Australian regions have their mice, pouched like the rest of the marsupials. Some are as large as rats, some very tiny; some have bushy tails, some tufted tails, some tails nearly without hair. The mere names of the Yellow-footed and the Brush-tailed tell us of outstanding characteristics, and the Jerboa Mouse reveals by its name that it is a pouched mouse much resembling the jerboa, not least in its leaping action in covering the ground.

Then there is the Banded Ant-eater, a curious marsupial with a long, sticky tongue and a broad, bold head ending in a narrow, flexible nose. The marsupials have produced a mole, too, and a remarkable mole it is—blind, but with sense organs on the skin of the head and on other naked parts of the furry body. These organs take the place of sight, it is supposed. They are instruments of touch—a sense apparently highly developed in the pouched mole of desert Australia. Its living is obtained beneath the surface of the sand, but what insects it finds no man knows.

THE BABY OPOSSUM WHICH RIDES ON ITS MOTHER'S BACK

That completes the list of Australia's marsupials, but there remain the true opossums of America. Some species, such as the Virginia Opossum, have pouches. Others have only relics of that organ, and the little ones depend for carriage on clutching the fur of the mother's back and attaching their clasping tails to hers, which she curves forward over her back.

This is a common habit of the Surinam Opossum of Dutch Guiana. Others do this occasionally, but it is the usual thing with this species.

Nearly all the opossums are tree-dwellers, as safe among the branches as a monkey. They come down at night, however, and play havoc with the live stock of farms, for they kill birds, and small animals. They will eat anything that can be eaten, vegetable or animal; a choice chicken, a sweet songster, a mass of carrion, wild fruits, such as grapes or persimmons, or the choicest vegetables.

THE MANY SPECIES OF OPOSSUMS IN THE NEW WORLD

There are about twenty species of opossums in the New World. Some South American representatives are hardly larger than mice, but the largest is about the size of a big cat. The noses, ears and tails of all the species are long. The tail is generally naked except at the base and has a scaly appearance like that of a rat, and is prehensile. This means that it can be used for grasping or holding like that of the New World monkeys. An opossum can wrap its tail two or three times around a branch and hang comfortably as long as it wishes to keep the position.

Some of the opossums have strayed to the treeless plains of South America. We cannot but wonder how they feel, with their unexcelled gift for climbing but with never a tree to scale. We have evidence of the adaptability of the group, however, in the Water Opossum. This creature has taken to an aquatic life, and has webbed feet for swimming. Yet it still has the pouch for its babies.

Though many species make up the opossum group of the New World, only one ranges into the United States. There are three recognized local varieties of this species, known as the Virginia, the Florida and the Texas, but the differences are slight. All have pouches and all eat everything, and in turn are eaten by man. 'Possum-hunting is a favorite sport of the Southern farm boys, white or black. Specially trained dogs trail the animal which has usually taken refuge in a tree before dogs and boys come up.

HOW THE COMMON, OR VIRGINIA, OPOSSUM LOOKS

The so-called Virginia opossum ranges as far north as southern Canada, though it is more common farther south. It is difficult to describe its color. The coarse hairs are of a yellowish tint, but on the upper parts are tipped with brown or black. Some coarser white hairs are intermingled with these, and the animal looks unkempt, and would never be ranked high for its beauty.

They are solitary animals and two are seldom seen together. The young are usually born in a hollow tree or stump, where the mother has carried some dried grass or leaves. Though the mother is as large as a cat, the young when born are about the size of young mice. There are from six to twelve of them and they remain in their mother's pouch for about six weeks and grow very rapidly. Even after they begin to run around they return to the pouch for protection.

HOW NATURE PROTECTS A CURIOUS GROUP OF BACKWARD CREATURES

All are noted for their tenacity of life. As we all know, to "play possum" is to pretend, the phrase coming from what is regarded as the death-like pretense of badly wounded opossums. They submit to terrible violence and injury, lie stiff and apparently dead; then, when at last they think no one is watching, they nerve themselves for a new effort and quietly creep away to safety. Very often they are successful in escaping from their captors by this stratagem. Negroes tell many interesting stories of their ability to deceive experienced hunters.

It is highly unlikely that this is "feigning death" at all; most probably it is the insensibility of terror which makes the animal unconscious of injury while under punishment. The Cuscus and the Opossum are supreme examples of this, but that is not surprising. In all lowly organizations there is great resistance to death. It seems to be Nature's shield to guard against the consequences of insufficient intelligence, and marsupials are almost the least intelligent of mammals.

ANIMALS THAT HAVE MISSED THE INVIGORATING TIDES OF PROGRESS

Whether they are degenerate, as some believe, or merely primitive, as others think, they are inferior to the general body of mammals. But that they are hopelessly inferior in brain and beauty to the great cats, the dogs, the deer and the cattle, there is not the least question. Nevertheless, they are a fascinating study, both for what they are and for comparison with the more advanced animals.

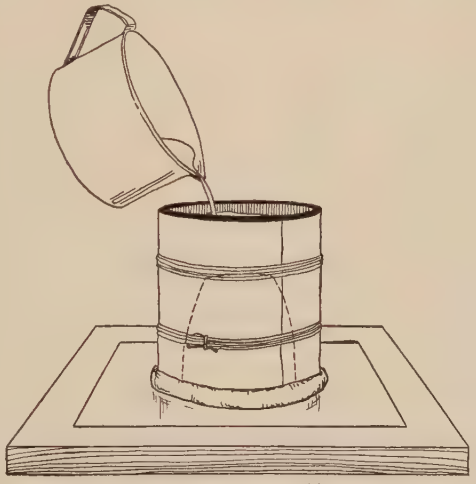
THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 2591.

CASTING DISHES IN PLASTER MOLDS

CONTINUED FROM 2382

HAVE you ever wondered how any number of dishes can be made just alike? The following method, which is still used in many potteries, will make it possible for you to make a plaster mold for a dish that can be reproduced in clay as many times as you may prefer. The dish chosen should be simple in form, without a handle and free from a projecting flange or ring at the bottom. For example, a custard cup or a small bowl will be found quite satisfactory for making the plaster mold.

In making the mold the process can be simplified by turning the dish top down upon a piece of oiled paper which has been placed on a fairly smooth piece of wood. Then roll a piece of heavy flexible paper into a circular form about one inch wider than the height of the dish for which the mold is to be made, and long enough to surround the dish, allowing more than one inch between the paper strip and the dish all the way around. The strip may be tied together with a piece of string to serve as an outside form wall. This wall can be strengthened by banking clay around it on the outside. The size, which prevents the plaster of Paris from sticking, is next prepared by putting a small piece of soap into a dish containing ½ pint of water. The water is heated and the soap is allowed to dissolve. The size is next allowed to cool. When cool it will be found to be of the thickness of molasses. A coat of size is now carefully spread with a brush over the entire surface of the inverted dish.



1. Making the mold.

The plaster of Paris is next mixed for pouring. About 5 pounds of plaster should be used with 2 quarts of water. The plaster is dropped into the water a handful at a time, until the required amount has been added. It is then allowed to soak for a few minutes, after which the mixture is thoroughly stirred with the hand to the thickness of cream. Soon it will be felt to thicken. When it has become somewhat thick it should be poured at once over the inverted cup as shown in picture 1. Care should be taken to cover all parts of the surface and to fill the form to the top of the wall. Any air bubbles must be either broken or kept from being poured into the form. The work is now left for a few minutes while attention is given to the mixing-dish, which must be rinsed out at once before the plaster sets. The process of hardening, called setting, began as soon as the liquid plaster was poured into the form. In about 10 or 15 minutes from the time of pouring, the plaster will begin to heat. This indicates the completion of setting. The form is now removed, and

the sides of the plaster mold may be trued with a knife. This is easily done, as the walls are still quite soft. The plaster cast is now turned over, the dish is removed, and the mold is put away to dry. It is important to have all water dry out of the plaster. As many additional molds may be made by this method as kinds of dishes are needed.

In casting the dishes a mixture of clay and water, called slip, is poured into the plaster of Paris molds. It is found advisable to make this slip in as small quantities as needed. Large bowls or pails may be used in which to do the mixing. Into about 1 quart of water is placed one large lump or several small lumps of clay, kneaded to a plastic condition. The clay is now mixed with the water by constantly squeezing the lumps of clay at the bottom of the mixing-dish until they almost dissolve. The mixture of clay and water will become thicker and thicker as additional particles of clay become suspended in the water, until the liquid resembles a batter. The slip is now poured through a sieve to remove any remaining lumps of clay. The plaster molds, which are to be poured, are now arranged. Before using the slip it should be slowly poured back and forth from one pitcher to the other in order to break any air bubbles.

2. Casting the dishes.

Each plaster mold still retains some of the soap size, which must be removed before it can be used. It is therefore cleansed by being filled with the slip, which is at once emptied out. It is then allowed to stand for several minutes in order that the water may be absorbed from the clay which has been deposited upon the walls. This thin lining of clay is now picked out by means of a small piece of plastic clay, which is pressed against it, or it may be wiped out with a piece of cloth. After cleaning, the form should again be allowed to dry out thoroughly.

The plaster molds are again arranged for pouring, and each is poured brimful of slip. This is allowed to round over the opening in a little mound (see picture 2), which gradually sinks lower and lower into the form as the water is absorbed into its plaster walls. Shortly after the forms have been filled they will be ready for refilling. The process of filling is continued, each of the forms being kept brimful. After each form has been kept full for 2 or 3 minutes, a broad knife-blade may be scraped across the brim of each form in order to determine the approximate thickness of the clay wall which has been drawn to the inside of the plaster form. This clay deposit forms the wall of the dish which is being cast. A thickness of at least $\frac{1}{8}$ inch is desirable. If the wall in each case has not become this thick, the pouring must be continued until it is.

Then the plaster form is carefully raised so that the free slip may be poured out. Next the form is inverted upon two blocks or sticks in order to allow the air to circulate into it. When this is done, a small amount of slip will drip from the form, but this will stop as the drying begins. The forms should be left undisturbed for at least 1 hour. At the end of this time these may be examined for removal. If it is found that the drying has progressed far enough, the dishes may be removed, as the clay wall will have shrunken slightly from the plaster. The newly cast dishes (see picture 2) are then put aside to dry.

After these have become quite dry they should be finished by rubbing with fine sandpaper. They are then fired to prevent them from crumbling. This may be done in a covered iron kettle which is placed on an open wood fire or a slow-burning stove. In either case it is important that the heating as well as the cooling of the kettle should be gradual. Of course, the firing of the pottery may be done in a real kiln if one happens to be available in your community.

HOW MEAT PRODUCTS ARE USED

PERHAPS you are planning to visit a meat-packing establishment. You have doubtless read about the meat-packing industry from time to time, as we are always interested in knowing about our most important foods. But have you also learned how the Swift Company, the Armour Company, and others use many of the parts of the animals which we do not use for food? Of course you know that a large number of our American cattle are still raised on the western plains, while the hogs are chiefly raised in the corn belts. When these animals are ready to be sold they are loaded in freight cars and sent to market, the chief centre of which is Chicago. Upon arriving at the stock yards they are unloaded into pens, where they are inspected by government officials and then are usually sold to the highest bidder.

Before the hogs are killed cold water is turned on them, and they are then fastened by chains to a large wheel, which automatically raises them and places them head downward on hooks which slide on a sloping rail. As they slide down this rail the processes are divided so that each man has his respective work to do, such as killing, placing in scalding vat, scraping, or cutting up. All of these processes take only between 10 and 14 minutes. The cattle are first killed and then placed on the sloping rail, where the different parts, such as the horns, hoofs and hide, are taken

off. The carcass is then cut in half. This takes only from 18 to 22 minutes.

These are then hung in drying-rooms for a few hours before they are transferred to coolers of a temperature just above freezing. They are left there for 48 hours, or until they are ready to be still further cut up. Some of the parts into which a hog is cut are ham, shoulders, bacon and loins. The parts are graded, trimmed, cured, tested, branded (by paint) and smoked from 24 to 48 hours. The parts to be sold fresh are then sent to the different markets. Pork sausage is chopped and mixed, and the cases, or skins, are stuffed by machinery. The fat of the hog is used for lard. The beef is generally cut in halves, then loaded into refrigerator cars and shipped to the various markets.

Some by-products which are made use of are: the blood, for fertilizer, albumin and stock food, also for sizing paper and refining sugar; hides, for leather; hair, for camel's-hair brushes and shoddy, a sort of cloth; hip-bones, horns and shoulder-blades, for hairpins, combs and buttons; thigh-bones, for toothbrushes and knife-handles; hoofs, scraps of hides, and bones of hams, for glue; tail-hairs, for cushions and mattresses and for bristles of brushes; lining of pigs' stomachs, for pepsin; fat, for soaps and oleomargarine; dirt and refuse, for fertilizer. Although much has been done in this industry, Swift has perhaps done more than any other one person in utilizing all parts of the animal.

During the World War millions of men were fed on meat that had been canned in a meat-packing establishment.

HOW TO IDENTIFY A CARD

WE take a pack of cards and ask one of the audience to hold it. Then we ask someone else to select a card from anywhere in the pack, to look at it so that he can recognize it again, and to show it to the audience but not to us. Then we ask the friend who selected the card to place it at the bottom of the pack. The holder of the entire pack is then requested to lay the pack on the table face downward.

We must invite a third to assist us. His part of the performance is to cut the cards—that is to say, to lift any number from the top of the pack and put them at the bottom.

Finally, we ask yet another member of the audience to lay the cards face upward on the table one by one, beginning at the top. When he has done this we are able to tell the audience which was the card selected.

This looks very difficult, but is really very simple. Before handing over the pack at the beginning we look to see which card is at the bottom of the pack. When the cards are finally laid on the table one by one, the selected card must follow after the card which we saw at the bottom. It is better not to name the card the moment it is placed on the table, but to wait until the pack is finished.

THINGS TO REMEMBER WHILE BATHING

ONE of the greatest pleasures and healthiest exercises of a holiday by the sea is the bathing; but while it has great advantages, we must remember that bathing must be indulged in according to certain rules or it may be injurious rather than helpful.

We should never bathe, for instance, within two hours after a meal, nor should we bathe when fatigued. Only those who are very strong should bathe early in the morning on an empty stomach. Young people and those who are weak should bathe two or three hours after breakfast. We should bathe when the body is warm, and no time must be lost in getting into the water. Then, as soon as we come out of the water we should dry and dress ourselves. It is dangerous to get the body chilled by sitting or standing about undressed after being in the water. Never remain in the water too long—it is a mistake that many bathers make. As soon as there is any feeling of chilliness, come out and dress.

If we get a chilly feeling, with numbness of the hands and feet, after being in the water a very short time, we should avoid bathing in the open air altogether. Nobody who is subject to dizziness or faintness or palpitation of the heart should bathe without first consulting a physician.

Many good swimmers who have met with disaster have been supposed to suffer from cramp, whereas the pressure of the water on the drum of the ear has caused vertigo and unconsciousness. It is therefore a wise precaution for a bather to put a small plug of cotton in each ear.

The best place at which to bathe is a sloping beach of sand or gravel where the tide is not very strong, and where there are no awkward currents that may sweep a bather off his feet. A muddy bottom should be avoided, and the spot selected should be free from holes, weeds, sharp stones and broken bottles. It is always a good scheme to take a walk on the beach at low tide in order to see whether there are any of these obstructions to pleasant bathing. Holes are particularly treacherous. A hole six or seven inches deep seems scarcely noticeable when there is no water in it, and yet to an inexperienced bather it may prove a positive danger. If by any chance our feet should slip into such a hole while we are in the water, we must have the presence of mind to keep the mouth shut. Opening the mouth so that the sea-water gets in is a fruitful source of disaster, for with the rush of water all presence of mind is usually lost.

A novice entering the water for the first time might well use water wings near the shore or be assisted by one who can swim. Having selected the best place at which to enter the water, one should wade in carefully up to the chest, then turn toward the shore and dip. Having obtained confidence, one may wade up to the armpits and then move about as much as possible, jumping up and down and dipping.

STRONG CONSTRUCTIONS FOR CRATING

THESE helpful suggestions on crate construction will make it clear that one of the features of a good crate is its ability to resist weaving and skewing during transportation. No method of joining the corner members of a crate, not even the 3-way corner construction explained below, is sufficient alone to give the needed strength to a crate. Some kind of bracing is usually necessary.

Figure A shows a kind of bracing found in many crates which are sent to the United States Forest Products Laboratory, Madison, Wisconsin, for testing. Partly because of the amount of material used, this construction appears to be very strong. Laboratory tests have shown, however, that crates so braced are weak in the diagonal direction of the faces, and are therefore apt to weave and skew during transportation.

Diagonal braces on six sides as shown in Figure B have been found to give a crate maximum strength with a minimum amount of lumber. Crates so braced withstood twice as great a diagonal force in actual tests as did the crates braced as shown in Figure A.

A combination of diagonal and parallel slat bracing, as shown in Figure C, makes the crate more rigid than parallel bracing alone, but not so rigid in all directions as cross bracing on the six sides. It may be found an advantageous construction in packing contents which need protection on the sides and are rigid enough themselves to withstand stresses in the direction in which the crate is weak.

Solid boarding or sheathing on all the faces does not make a crate so strong as diagonal bracing, except perhaps sheathing which is made of wide boards with tighter joints than can usually be obtained. The crate with ordinary sheathing might withstand as great a load, but the stress caused by that load would be greater than in a crate with diagonal braces, and would ordinarily be great enough to allow possible damage to the contents.

As suggested, the corner is the weakest part of the ordinary crate. The following facts about crate corners observed in tests at the Forest Products Laboratory should be of assistance to all persons who build crates, in the strengthening of the weak parts by better arrangement of members and methods of nailing or bolting.

An example of unsatisfactory crating frequently met with is that shown in figure 1. This construction is poor because the nails holding one member are driven into end

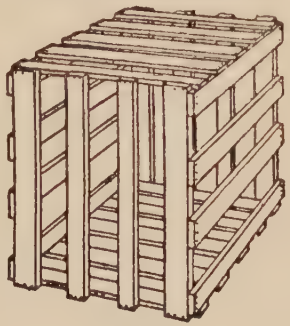


FIG. A

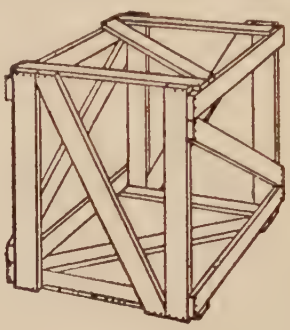


FIG. B

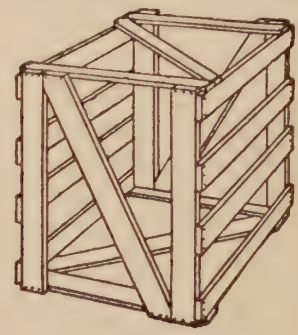


FIG. C

Types of completed crates.

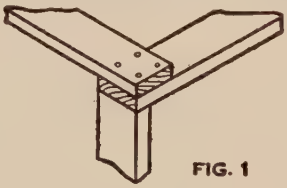


FIG. 1

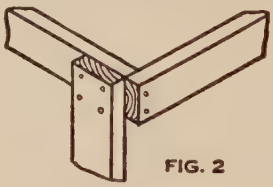


FIG. 2

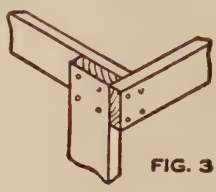


FIG. 3

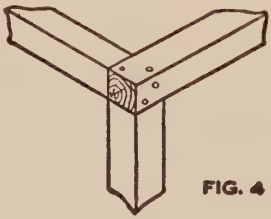


FIG. 4

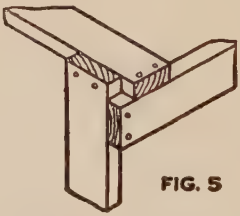


FIG. 5

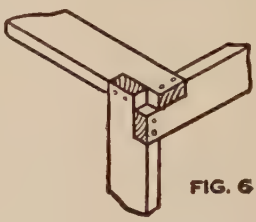


FIG. 6

Types of crate corners.

grain and consequently have comparatively low holding power. Another common example of the same fault is shown in figure 2. This construction may be improved (figure 3) by lengthening the member to permit nailing into the side grain.

The corner construction shown in figure 4 is very weak, because the only nailing possible is through one member into the end grain of the other two. This style of corner is frequently used in crates which are to be entirely covered with sheathing. In a crate without sheathing it would of course be worthless.

In figure 5 each member is nailed to another member and has the third member nailed to it. This is the most effective arrangement. It is called the "3-way" corner, and its distinguishing feature is that each member is held by nails or bolts in two directions. Figure 6 is suggestive of further variations of the 3-way principle, with the members notched together.

Seldom, if ever, does the 3-way corner construction increase the volume of the crate. On the contrary, it usually reduces the space occupied. When properly nailed or bolted this type of corner has a considerable bracing effect, although, as pointed out, it does not do away with the need for diagonal bracing.

The best crate made will not emerge undamaged from a freight office where men are careless and rough in their methods of handling it. It is always well to paste on the crate, if it is going any distance, a sign bearing the words "Handle with care" in large letters.

PLANTS THAT GROW ON SHORT NOTICE

WHEN the days are fine and bright there will always be plenty to do in the piece of garden which is one's very own. In rainy weather, and during the winter, those of us who love to grow plants seem to be separated for a while from our treasures. There is no reason why this should be so, for, with a little care, we may easily have an indoor garden that we can enjoy all the year round.

Now, most plants, of course, grow in soil; but there are a certain number which may be kept alive without any earth at all, if they can have plenty of fresh water. These plants are just what are wanted for an indoor garden, as there is no need to use any mold, which is rather dirty to have in the house.

The best plan for the garden without soil is to get permission to use a table or a shelf near a window; and in order to prevent the water from spilling on the floor, it is just as well to have one or two large trays on which to place the plants.

It is very interesting to sow various kinds of seeds in the indoor garden, such as canary-seed, cress or linseed. For this purpose clay shapes can be purchased at a florist's shop. These are sometimes made in the form of a man's head or a pig and are very quaint-looking. The idea is to sow the seeds on the roughened part, and in this way, when the little plants are grown, to give the object the appearance of having long, upright green hair. The shapes are hollow, and must be filled with water.

Cress seeds growing on a clay head.

The best way to sow the seed, which is bought in small packets, is to place a little in a teaspoon and then shake it over the rough surface. As the water will soak through the clay, the shape must, of course, be filled up afresh every day.

Another way of growing small seeds is to borrow a sponge—a good big one if possible—and, after soaking it in water, sprinkle the seeds fairly thickly over the surface. If we want the seeds to grow quickly, we keep the sponge in the dark until the little plants appear. We then put the whole thing in a light place and keep it watered every day, or let it stand on a tumbler of water, and soon the sponge will be covered with bright green plants. If the sponge is not allowed to get dry, the seedlings will last for quite a long while. We may use a piece of thick flannel instead of a sponge, and it will do nearly as well as the other.

Some of the most curious plants for our indoor garden are those known as Resurrection Plants. They are called by this name because when they are in a dry state they look just as if they are dead, but if they are placed in water they become green and alive. Everybody who has a garden without soil should try to get one or two of these plants, for they can be easily purchased.

When we receive our first Resurrection Plant we may think that the dealer must have sent us a dead plant by mistake, so dry and withered will it look. But we must not make up our minds, however, until we have followed the directions which are given here. We must get a bowl large enough in size to take the plant, and fill it with warm water. Now we take our plant and put it into the water, pressing it down so that it will become well soaked. Next we put the bowl in a warm place for a few hours.

When we come back we shall find that the dead-looking Resurrection Plant has expanded into a beautiful green one which is wonderfully fresh and alive. The plant is now quite ready for taking to the indoor garden, where it may be put in a saucer of water. It will keep green as long as water is supplied, but it is not wise to allow the plant to grow for too long a period at a time. After a week or so the Resurrection Plant must be dried off and allowed a month's rest, when it may be soaked into life again.

Many kinds of plants will root and grow for a long time in plain water alone. One of these is the spiderwort, a variegated plant often seen in cottage windows, which will live and send out a lot of roots in a glass bottle. Sprigs of ivy can be made to do very much the same, and there was a lady who decorated her fireplace in the summer in this way. The shoots of ivy were placed in jars of water and sent out many roots.

A bed of cress growing on a wet sponge.

In January, if small branches of some of our flowering trees, such as almond or wild cherry, are gathered and kept in vases of water in a warm place, they will come into full blossom long before their natural time. In all these cases it is necessary to keep the water in the jars quite fresh, and this will be easier if a piece of charcoal is put into each.

An interesting curiosity, which will do well for our garden without soil, is the arum from India, called the Monarch of the East. Bulbs of this strange plant can easily be obtained from the florist at a small price. It is one of the most remarkable plants in the world, for it will produce its great flower not only without any soil at all, but without water either.

The only thing we need do is to place the bulb, when we get it, in a light position, and simply leave it. If the room is nice and warm, it will not be long before the bulb will send up a long shoot, which quickly grows into a most magnificent flower, sometimes two feet long. This is all colored crimson and yellow, and bears a long red spike. The best time to buy the bulb is about January.

If we want the bulb of this arum to live after it has flowered, we must plant it in earth, in a pot or out in the garden. After a while, in place of the great flower, will be sent up a giant leaf, which is really very handsome. At the end of the summer the bulb may be taken up and allowed to become dry, and then it can be put into a light place again, ready for flowering once more.

Spiderwort growing in water without any soil.

The Resurrection Plant, which seems to be dead and withered but comes to life again in warm water.

There are many other things that we might put in our garden in the house. Most children know that an acorn will grow into a fine little oak tree if it is placed in a narrow-necked bottle which is kept well filled with water. In the same way, snowdrops and the dainty little blue scillas may be grown, and give us some gay flowers for the indoor garden. When we are out in the woods we may gather portions of the bright green mosses, and these will live for many weeks if put into saucers containing a little water.

By getting together a collection of these different plants that do not require soil, quite an interesting indoor garden may be made, and this may become really pretty if the plants that form it are daintily arranged. It is surprising what a variety of colors can be obtained in the garden without soil. The flower-lover can choose the right color of flower to go with the house decorations, and can change the color to suit seasons and moods. That is an advantage.

A CHRISTMAS GYMKHANA

A "GYMKHANA," Meg explained very carefully, "is a party at which everybody plays new kinds of games—funny games that make you laugh, and exciting games, with prizes for those who win."

When all the children had arrived, they found that the drawing-room had been almost cleared as if a dance were to take place; but down the centre of the room they saw two rows of bottles standing upright, with little Christmas-tree flags stuck into the corks. There were eight bottles in each row.

The children could not think what they were for until Meg explained. She said that the first game was to be a Driving Match. Two girls were to be blindfolded and harnessed together with ribbons, and a boy would drive them up and down the room and would steer them first to the right and then to the left between the bottles, so that none of them upset.

Two boys and four girls would begin together, and the team that got back to the starting-place first would win.

Everything was arranged in a minute or two, and the girls, with handkerchiefs over their eyes and the harness of bright-colored ribbons tied to their arms, stood ready to run the moment the word was given.

The boys who were to drive them were told that they must not speak to the girls, but must steer them between the bottles by pulling on the reins.

Everyone was quite silent while Meg clapped her hands and then called out: "One—two—three. Go!"

The girls dashed off in a moment, and the boys had to hold them back with the reins to keep them from going too fast. Of course the boys could see where they were going, but the girls could not, and sometimes they all got so excited that when the driver tugged at the reins one way they all went off in another direction. One team turned right around and went in the wrong way altogether, and before they could be got right again they had upset two of the bottles.

One team got to the end of the row of bottles without upsetting a single one, and then turned around to come back. But they turned the wrong way and ran right into the others and all got mixed up.

At last they got the reins untangled, and then there was a fine race down the room. The two teams were so close at the finish that everyone thought they would get back together, but at the last moment one of the girls just touched one of the bottles with her dress and knocked it over. This stopped them for a second, and so the other team won.

After this first driving race everybody wanted to try, and Meg said that the teams that won must stand on one side of the room and those that lost on the other. Afterward those that won would try again, and go on trying until they were beaten.

Of course after about half an hour there were only two teams left, and then came the most exciting race of all, because the one that won this time would have the prize.

When all the driving races were over, Meg said they would have an Egg and Fan Race.

Two eggshells were brought in. They were quite hollow, for the inside parts had been blown out through little holes made at each end with a pin.

These two eggs were placed on the floor, and two boys were told that they must crawl along and blow them to the other end of the room, where two girls would be waiting with fans. The girls would have to fan the eggs back to the starting-point, and, of course, the one that got back first would win. This was even better fun than the driving race, because the boys looked so funny crawling along on their knees and trying to blow the eggs so as to make them go straight. It was much more difficult than it looked, because the eggs were not round, and therefore they would roll off in every way but the right one.

The girls found that it was even worse to fan the eggs along than to blow them, for, instead of going straight, they would go first on one side of the room and then on the other. One girl got so angry with her egg that she gave it a bang with her fan and broke it.

The children who were watching laughed so much that they thought they could not laugh any more; but Meg presently suggested a Basket Race, which was still more exciting.

Two big clothes-baskets were brought in, and to each one there was tied a rope long enough to reach from one end of the room to the other. The baskets were placed at one end and the ropes stretched to the other.

Then two boys and two girls had to stand together, and when Meg called out "Go!" the girls ran down the room as hard as they could and jumped into the baskets. The boys had to pull them back with the ropes.

This was great fun. The boys tugged and tugged, and first one basket with a girl in it would be in front, and then the other. All the children shouted, and said that this was the best sort of race yet. The girls were so anxious to try that they could hardly wait for their turns. It was so fascinating to be pulled along like that, especially when the baskets were so close together that no one could tell which would win.

When all the races were over, Meg said they would finish up the evening with a dance—but not an ordinary sort of dance. It was to be what she called a Cotillion.

Instead of the boys asking the girls to dance, the girls chose their partners, but had to do this in all sorts of funny ways.

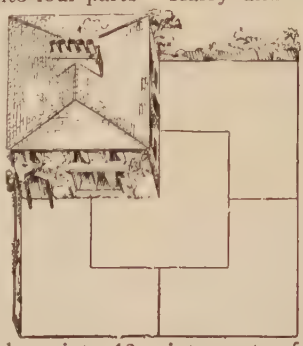
Meg brought in a big doll made of pillows, dressed up in one of her own dresses.

She put two chairs in the middle of the room, and then made the pillow-doll sit on one chair and one of the girls on the other. Then two boys came, and the girl had to give the doll to the boy she did not want to dance with, and then she waltzed around the room with the other boy.

This looked very funny, because one boy always had to dance with the doll, and it looked perfectly absurd. But everyone laughed and enjoyed the antics of the queer couple.

HOW THE FATHER DIVIDED HIS GARDEN

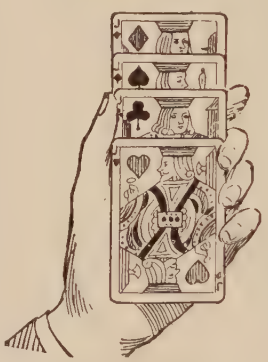
ON page 2380 is the problem of the garden which had to be divided into four parts equal in size and shape. The bird's-eye view of the garden here given shows us exactly how it appeared after being so divided. In order to solve the problem we must set to work like this: First, we must make a tracing of the house and garden. Now, we know that the house stands upon one quarter of the whole ground, so if we continue the sides of the house we shall divide the garden into 3 equal squares. Next we divide each of these squares into 4 equal squares and we have the garden divided up into 12 small squares, all equal. By taking 3 squares for each child, the father was able to give Harry and Leslie, Doris and Gertrude each a plot of ground of the shape shown in our picture here. We can see at a glance that each piece is equal in size and shape to the others, but if we divide the garden in the way described here, we not only get the correct solution, but are able to see how and why the plots of ground are equal. The boys and girls were very much interested in their father's division of the garden, and they agreed that although at first they had thought it difficult and almost impossible to divide the ground into parts of equal shape as well as size, the solution was really simple.



THE ROBBERS AND THE SOLDIERS

THIS card trick is very simple, but rather mystifying. It requires no expert ability to perform, hence it is one that is very suitable for young conjurers.

The conjurer has a pack of cards, and he takes out the four knaves, which he holds up to the company in the manner shown in picture 1. Then he tells the company his story. "Once upon a time," he says, "there were four robbers in Spain, and their robberies had caused them to be pursued by a band of Spanish soldiers. These four knaves are the four robbers. As they fled they came to a ruined castle, and the pack of cards here is the castle. The robbers entered the castle"—here the conjurer lays the cards in his hands, face downward, upon the rest of the pack—"and held a council. They decided that one of their number should keep watch."



1. The four robbers.

At this point he lifts the top card and throws it, face upward, upon the table, then resuming: "That is the robber who kept watch, and the other three went down to the dungeon to sleep."

Here he takes the three cards on the top of the pack one by one, and, without allowing their faces to be seen, he puts them at the bottom of the pack. He keeps up his story as he does so: "These are the three robbers who went down to sleep, and it was agreed that if the watching robber saw the soldiers approach, he should at once call the others. Shortly after midnight the robber who was keeping watch saw, where the moonlight shone through the trees, that a company of soldiers was approaching. He immediately called to the others: 'Come up, come up, come up!' "—here the conjurer flips the edges of the pack with one hand—"and immediately the robbers all sprang to their feet."

At this point he takes the three top cards in the pack and throws them, face upward, on the table. They are the other three knaves, which the members of the audience are positive that they saw placed at the bottom of the pack. How did they get to the top? That is what the audience cannot understand, and what you want to know in order to be able to perform the trick.

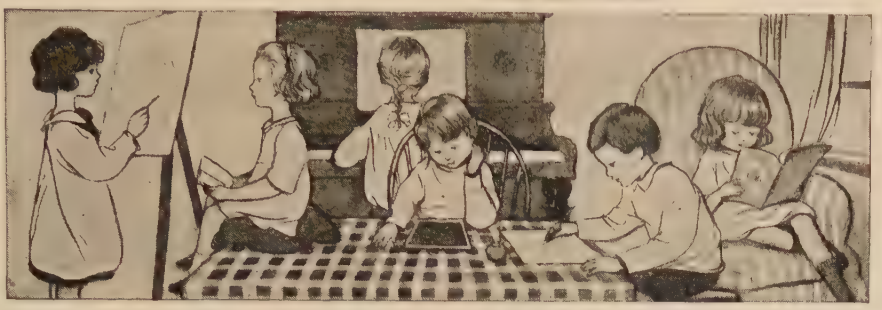
The explanation is very simple. The three knaves were not put at the bottom of the pack at all, although they seemed to be. The conjurer had seven cards in his hand, not four. Between the first knave and the second knave were three other cards—any three—from the pack, but they were placed so that they could not be seen by the spectators.

If the conjurer had spread out the cards, which, of course, he would not do, as it would have exposed the trick, they would have been like picture 2. Thus the three cards that were put at the bottom of the pack were the three hidden cards, not the knaves at all, and the knaves remained at the top of the pack, ready to be exposed as soon as the watching robber called: "Come up, come up, come up!"

2. The cards as they would look if spread out.

This is a good trick, but it should not be performed too often in front of the same audience or it is very apt to be found out. Someone's sharp eyes will notice the three extra cards, then—discovery.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 2645.



MORE WORTHWHILE GAMES

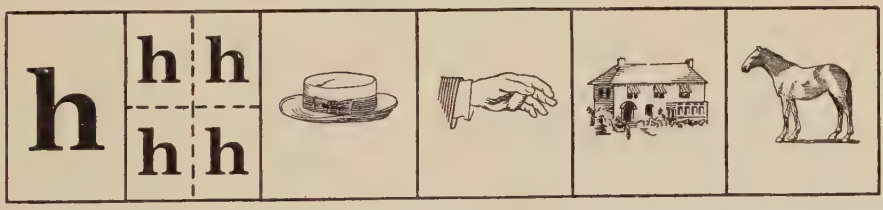
CONTINUED FROM 2392

SOUND GAMES WITH WORDS—SUBTRACTION GAMES

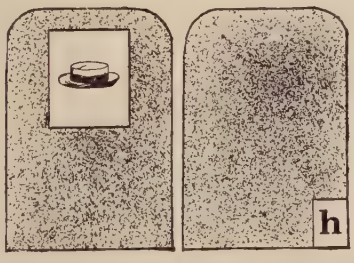
IN your reading you find new words which are not in your dictionary and you have to ask someone who knows what they are. If you knew the sounds in these words, often you could find out for yourself what the word is. You can make sets of cards from which you can learn about these sounds. You can use them in many different games.

Do you know any words that begin like and ?

On page 117 of your Work Book you will find the pictures of four things that begin with that sound.



Put each one on a card, and on the back at the bottom put the letter that says that sound. Make a pink card for the big letter that says the same sound. This makes four picture cards and one letter card for each of the sounds. They all belong to the same book.



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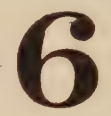
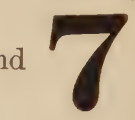
Make another book for words that begin like and

Make another book for words that begin like and

Make another for words that begin like and

Make books for words like and and  and 

THINK of the games you can play with these cards. You remember how to play Match Mine? You could play that with these cards. If you put down a card and say, "Feet. Match mine," Mary will put down her picture of fish and say, "Fish begins like feet." Then turn over your cards and see if there is an f on the back of both. If Mary made a mistake and put down a card which does not match, she will, of course, have to take it back. The first one to get out of cards wins the game.

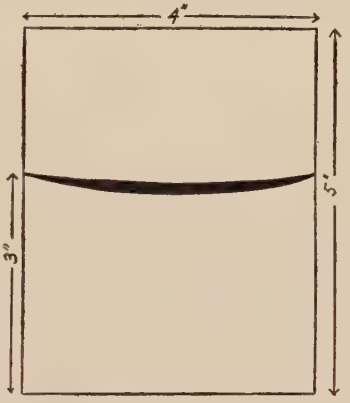
YOU can play a draw game, too. Divide the cards around so you each have some and then begin to draw. You draw from your next door neighbor and he draws from his next door neighbor and he from his and so on all around. Of course you draw, "sight unseen." That means without looking at your neighbor's cards, to see what you draw. But as soon as you draw a card, look carefully at it to see if you already have some that belong with it. Put them all together and try not to have your neighbor draw any of these. See who will get a book in his hand. As soon as you get a book, put it aside for scoring. As soon as anyone is out of cards you stop and count up. You count books. The one who has the most books wins the game.

This game is great fun and if you keep on playing it with the other children, you will learn to know the sounds these words begin with. You can practice up by yourself until you can say them both fast and right.

YOU can play alone, this way.

Put down the pink cards which tell the sounds. Match to each of them the pictures of things that begin with that sound. When you have finished see how many you have right. Turn over the picture cards and see if the name of the sound is the same. You score as many as you have Just Right.

YOU may make an envelope to keep this set of cards in. Make it of window shade material or canvas or anything that will be very strong. The picture shows you how to plan it. Make the envelope four inches wide and five inches tall in the back but only three inches tall in the front.



Mark your envelope so you will know which set of cards this is. Since there are pink letter cards in all these sets, put a piece of pink paper on your envelope and on it write Set 1. When you make the next set, write Set 2 on the pink paper. Mark the next set, Set 3, and so forth. They will all belong to the group of sound games with pink letter cards.

When you can score Just Right on this set make another set with different sounds.*

You will find the pictures and the letters for the second set on pages 119 and 120 of your Work Book, and when you can score Just Right on Set 2, you will be ready to make Set 3. Set 3 comes right after Set 2. These three sets of cards will help you learn most of the

*Note to Parents: The first set includes the breath sounds, the next set, the voice sounds and the third set, the nasal sounds of the most common consonants.

sounds that words begin with. All of these sounds you have been learning are called consonant sounds.

The fourth set makes you listen for different sounds. See if you can find out what sounds they are.

Say the names of these pictures.

You can hear the same sound in all of them.

Now say these.

10

You hear another sound in them, do you not?

Then try these and listen for another sound.

These have still a different sound.

6

These sounds you have been listening for are the vowel sounds. You make your Set 4 just as you did the other three sets, but remember to listen for the vowel sound to make up your books when you are playing games.

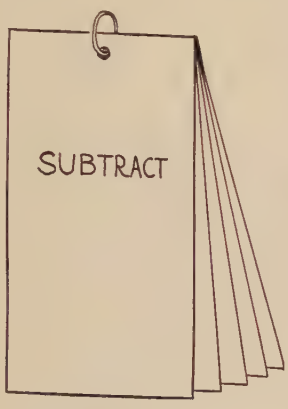
WHEN you can score pretty well in the games with these sets, you might try a speed game with them. Stop is a speed game because you have to play fast. You have to play your cards before the leader says "Stop." You can decide before you begin the game how long a turn the leader will give and then every leader will make the turn that long. You can use your sand timer, or you can count to ten, or decide in any way you think best how long a turn to have.

This is the way to play Stop. Divide the picture cards and put the pink cards in the middle, blank side up, so they all look alike. The leader turns one up and anyone who has a picture that belongs to it may put it in the middle if he can do it before the leader says

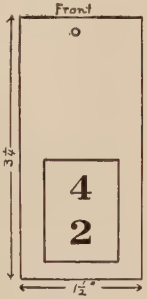
"Stop." Then each one who has played a card turns it over and corrects with the leader. The next child becomes leader and the game goes on, until someone gets out of cards. He wins.

WHEN you played with your pocket game for 1 2 3 4 5 and for 6 7 8 9 and when you played Hopscotch, were there some of the combination cards which bothered you more than others? Suppose you take out those combination cards and play Stop with them just as you have been playing Stop with the sound cards. You will need to make some colored cards with the digits on to put in the centre. Then when the leader turns up a 7 you will put down any card you have which makes 7 if you can find it and play it before the leader says "Stop."

If you can win in this game I think you know all these combinations very well indeed. We call these the Addition Combinations because we add them together



YOU remember the games "Better or Worse?" and "How Much Better?" Did you get so you could score Just Right in them? Then I think you can subtract. You remember when you took 3 from 4 and had 1 left, you were subtracting. If it is written this way Subtract $\frac{4}{3}$ it means to take the bottom number from the top one. So if the word Subtract is with the combinations they are called Subtraction Combinations and you subtract them. You take the bottom numbers from the top ones.



We are going to make a subtraction game, so put the word SUBTRACT on the very first card to help you remember that you are going to subtract. The picture tells you how to put the combinations and digits on the cards. Punch a hole in one of the cards, in the centre near the top. Use this to

mark the place to punch the others. Stick a linen eyelet over each hole to keep it from tearing out. Put all the cards on the ring. The digits are on page 123 of your Work Book.

If you are playing alone, bring five buttons or other small things with you. Look at the card. If it says $\begin{matrix}4\\3\end{matrix}$ put four buttons in your hand; take three away and see how many you have left. Yes, you have one left when you subtract three from four. As you turn over your card, you see the digit 1 which tells you that you subtracted right.

You may come to a card with a combination like this $\begin{matrix}4\\0\end{matrix}$ so put four buttons in your hand and take away no buttons at all. You still have the four buttons left. Zero is the digit which means nothing. You have subtracted $\begin{matrix}4\\0\end{matrix}$ and your answer is 4. Zero from four is four.

If you come to a combination like this $\begin{matrix}5\\5\end{matrix}$ put five buttons in your hand. Take away five buttons and you have no buttons at all. When you subtract five from five your answer is zero.

WHEN you have learned how to subtract you will wish to play subtraction games with the other children. You can use these cards in your hopscotch board. Put the card which says SUBTRACT in the centre so you will be sure to remember that you are playing with Subtraction Combinations this time.

If you make six extra colored cards and put a digit on each one, either 0 or 1 2 3 4 or 5, you can play these subtraction cards in your Big Wheel. You can play Stop with them.

WHAT HAVE YOU LEARNED?

CAN you match pictures whose names begin with the same sound?

Can you score in speed games with the Addition Combinations for 1 2 3 4 5 6 7 8 9?

Can you score in games with the Subtraction Combinations for 1 2 3 4 5?

THE NEXT HELPS TO LEARNING ARE ON PAGE 2747.

Signing the Mayflower Covenant—From the sculpture by Cyrus Dallin, by courtesy of Curtis & Cameron.

THE PRESENT CRISIS

JAMES RUSSELL LOWELL, poet, critic, ambassador, reaches his highest flight as an inspiring singer in this appeal to his countrymen to choose the side of goodness and humanity in the great war against slavery. This exalted poem will send forever a thrill of joyful self-surrender through all true lovers of liberty. Five stanzas are omitted here.

CONTINUED FROM 2368

WHEN a deed is done for Freedom,
Through the broad earth's aching breast
Runs a thrill of joy prophetic,
trembling on from east to west,
And the slave, where'er he cowers,
feels the soul within him climb
To the awful verge of manhood,
as the energy sublime
Of a century bursts full-blossomed on the thorny stem of Time.

Through the walls of hut and palace
shoots the instantaneous throe,
When the travail of the Ages wrings
earth's systems to and fro;
At the birth of each new Era, with a recognizing start,
Nation wildly looks at nation, standing with mute lips apart,
And glad Truth's yet mightier man-child leaps beneath the Future's heart.

. . . . . .

For mankind are one in spirit, and an instinct bears along,
Round the earth's electric circle, the swift flash of right or wrong;
Whether conscious or unconscious, yet Humanity's vast frame
Through its ocean-sundered fibres feels the gush of joy or shame;—
In the gain or loss of one race all the rest have equal claim.

Once to every man and nation comes the moment to decide,
In the strife of Truth with Falsehood, for the good or evil side;
Some great cause, God's new Messiah, offering each the bloom or blight,
Parts the goats upon the left hand and the sheep upon the right,
And the choice goes by for ever 'twixt that darkness and that light.

Hast thou chosen, O my people, on whose party thou shalt stand
Ere the Doom from its worn sandals shakes the dust against our land?
Though the cause of Evil prosper, yet 'tis Truth alone is strong,
And, albeit she wander outcast now, I see around her throng
Troops of beautiful, tall angels, to enshield her from all wrong.

. . . . . .

Careless seems the great Avenger; History's pages but record
One death-grapple in the darkness 'twixt old systems and the Word;
Truth for ever on the scaffold, Wrong for ever on the throne—
Yet that scaffold sways the future, and, behind the dim unknown,
Standeth God within the shadow, keeping watch above His own.

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Then to side with Truth is noble, when we
share her wretched crust,
Ere her cause bring fame and profit, and 'tis
prosperous to be just;
Then it is the brave man chooses, while the
coward stands aside,
Doubting in his abject spirit, till his Lord is
crucified,
And the multitude make virtue of the faith
they had denied.

Count me o'er earth's chosen heroes—they
were souls that stood alone,
While the men they agonized for hurled the
contumelious stone,
Stood serene, and down the future saw the
golden beam incline
To the side of perfect justice, mastered by
their faith divine,
By one man's plain truth to manhood and to
God's supreme design.

. . . . . .

For Humanity sweeps onward; where today
the martyr stands
On the morrow crouches Judas with the silver in his hands;
Far in front the cross stands ready and the
crackling faggots burn,
While the hooting mob of yesterday in silent
awe return
To glean up the scattered ashes into History's golden urn.

'Tis as easy to be heroes as to sit the idle
slaves
Of a legendary virtue carved upon our fathers' graves,
Worshippers of light ancestral make the present light a crime;—
Was the Mayflower launched by cowards,
steered by men behind their time?
Turn those tracks toward Past or Future
that make Plymouth Rock sublime?

They were men of present valor, stalwart
old iconoclasts,
Unconvinced by axe or gibbet that all virtue
was the Past's;
But we make their truth our falsehood,
thinking that hath made us free,
Hoarding it in mouldy parchments, while our
tender spirits flee
The rude grasp of that great Impulse which
drove them across the sea.

They have rights who dare maintain them;
we are traitors to our sires,
Smothering in their holy ashes Freedom's
new-lit altar-fires;
Shall we make their creed our jailer? Shall
we in our haste to slay,
From the tombs of the old prophets steal the
funeral lamps away
To light up the martyr-faggots round the
prophets of today?

New occasions teach new duties; Time makes
ancient good uncouth;
They must upward still, and onward, who
would keep abreast of Truth;
Lo, before us gleam her camp-fires! we ourselves must Pilgrims be,
Launch our Mayflower, and steer boldly
through the desperate winter sea,
Nor attempt the Future's portal with the
Past's blood-rusted key.

THE BLIND ARCHER

Sir Arthur Conan Doyle has expressed in this poem a lightness of fancy and touch. It is true that love surprises men and women of all ages and types, but none would wish it away.

LITTLE boy Love drew his bow at a chance,
Shooting down at the ballroom floor;
He hit an old chaperone watching the dance,
And oh! but he wounded her sore.
"Hey, Love, you couldn't mean that!
Hi, Love, what would you be at?"
No word would he say,
But he flew on his way,
For the little boy's busy, and how could he
stay?

Little boy Love drew a shaft just for sport
At the soberest club in Pall Mall;
He winged an old veteran drinking his port,
And down that old veteran fell.
"Hey, Love, you mustn't do that!
Hi, Love, what could you be at?
This cannot be right!
It's ludicrous, quite!"
But it's no use to argue, for Love's out of
sight.

A sad-faced young clerk in a cell all apart
Was planning a celibate vow;
But the boy's random arrow has sunk in his
heart,
And the cell is an empty one now.
"Hey, Love, you mustn't do that!
Hi, Love, what would you be at?
He is not for you,
He has duties to do."
"But I am his duty," quoth Love as he flew.

The king sought a bride, and the nation had
hoped
For a queen without rival or peer.
But the little boy shot, and the king has eloped
With Miss No-one on Nothing a year.
"Hey, Love, you couldn't mean that!
Hi, Love, what would you be at?
What an impudent thing
To make game of a king!"
"But I'm a king also," cried Love on the
wing.

Little boy Love grew pettish one day;
"If you keep on complaining," he swore,
"I'll pack both my bow and my quiver away,
And so I shall plague you no more."
"Hey, Love, you mustn't do that!
Hi, Love, what could you be at?
You may ruin our ease,
You may do what you please,
But we can't do without you, you dear little
tease!"

FAIR DAFFODILS

Robert Herrick, the writer of this charming song about the daffodils, was a clergyman who lived from 1591 to 1674, and wrote an immense amount of poetry, many of his poems taking rank among the most beautiful in our language.

FAIR Daffodils, we weep to see
You haste away so soon;
As yet the early-rising sun
Has not attain'd his noon.
Stay, stay,
Until the hasting day
Has run
But to the even-song;
And having pray'd together, we
Will go with you along.

We have short time to stay as you,
We have as short a spring;
As quick a growth to meet decay
As you, or any thing.
We die,
As your hours do, and dry
Away
Like to the summer's rain;
Or as the pearls of morning's dew,
Ne'er to be found again.

THE INCHCAPE ROCK

This fine poem by Robert Southey describes with great dramatic effect an old story of the east coast of Scotland which may possibly have been true. The Inchcape Rock, from which Ralph the Rover is supposed to have cut the bell, stands twelve miles out from the coast of Scotland. The poem is, of course, intended to show that an evil deed will recoil on the head of the offender.

NO stir in the air, no stir in the sea,
The ship was as still as she could be;
Her sails from heaven received no motion,
Her keel was steady in the ocean.

Without either sign or sound of their shock
The waves flow'd over the Inchcape Rock;
So little they rose, so little they fell,
They did not move the Inchcape Bell.

The good old Abbot of Aberbrothok
Had placed that bell on the Inchcape Rock;
On a buoy in the storm it floated and swung,
And over the waves its warning rung.

When the rock was hid by the surges' swell,
The mariners heard the warning bell;
And then they knew the perilous Rock,
And blest the Abbot of Aberbrothok.

The sun in heaven was shining gay,
All things were joyful on that day;
The sea-birds scream'd as they wheel'd round,
And there was joyance in their sound.

The buoy of the Inchcape Bell was seen
A darker speck on the ocean green;
Sir Ralph the Rover walk'd his deck,
And he fix'd his eye on the darker speck.

He felt the cheering power of spring,
It made him whistle, it made him sing;
His heart was mirthful to excess,
But the Rover's mirth was wickedness.

His eye was on the Inchcape float;
Quoth he, "My men, put out the boat,
And row me to the Inchcape Rock
And I'll plague the priest of Aberbrothok."

The boat is lower'd, the boatmen row,
And to the Inchcape Rock they go;
Sir Ralph bent over from the boat,
And cut the bell from the Inchcape float.

Down sank the bell, with a gurgling sound,
The bubbles rose and burst around;
Quoth Sir Ralph, "The next who comes to the Rock
Will not bless the Abbot of Aberbrothok."

Sir Ralph the Rover sail'd away,
He scour'd the seas for many a day;
And now grown rich with plunder'd store,
He steers his course for Scotland's shore.

So thick a haze o'erspreads the sky
They cannot see the sun on high;
The wind hath blown a gale all day,
At evening it hath died away.

On the deck the Rover takes his stand,
So dark it is they see no land.
Quoth Sir Ralph, "It will be lighter soon,
For there is the dawn of the rising moon."

"Canst hear," said one, "the breakers roar?
For methinks we should be near the shore;
Now where we are I cannot tell,
But I wish I could hear the Inchcape Bell."

They hear no sound, the swell is strong;
Though the wind hath fallen, they drift along,
Till the vessel strikes with a shivering shock:
Cried they, "It is the Inchcape Rock!"

Sir Ralph the Rover tore his hair,
He curst himself in his despair;
The waves rush in on every side,
The ship is sinking beneath the tide.

But even in his dying fear
One dreadful sound could the Rover hear,
A sound as if with the Inchcape Bell,
The fiends below were ringing his knell.

THE TRAVELER'S RETURN

Robert Southey here describes without exaggeration the purest and most delightful of all the human affections: the joy which comes when we return from a journey to the companionship of those we love beneath the roof of our own home.

SWEET to the morning traveler
The song amid the sky,
Where, twinkling in the dewy light,
The skylark soars on high.

And cheering to the traveler
The gales that round him play,
When faint and heavily he drags
Along his noontide way.

And when beneath the unclouded sun
Full wearily toils he,
The flowing water makes to him
A soothing melody.

And when the evening light decays,
And all is calm around,
There is sweet music to his ear
In the distant sheep-bell's sound.

But O! of all delightful sounds
Of evening or of morn,
The sweetest is the voice of love
That welcomes his return.

WISHING*

There is wise advice in these verses by Ella Wheeler Wilcox, for it is true that no amount of wishing will avail us anything if our wishes are not followed up by serious endeavor.

DO you wish the world were better?
Let me tell you what to do:
Set a watch upon your actions,
Keep them always straight and true;
Rid your mind of selfish motives,
Let your thoughts be clean and high.
You can make a little Eden
Of the sphere you occupy.

Do you wish the world were wiser?
Well, suppose you make a start
By accumulating wisdom
In the scrapbook of your heart.
Do not waste one page on folly;
Live to learn, and learn to live.
If you want to give men knowledge,
You must get it, ere you give.

Do you wish the world were happy?
Then remember day by day
Just to scatter seeds of kindness
As you pass along the way;
For the pleasures of the many
May be ofttimes traced to one,
As the hand that plants an acorn
Shelters armies from the sun.

THE DOG AND THE WATER-LILY

William Cowper, like most poets, was a great lover of animals, and among the many poems in praise of man's true friend the dog this by him deserves a high place.

THE noon was shady, and soft airs
Swept Ouse's silent tide,
When, 'scaped from literary cares,
I wander'd on his side.

My spaniel, prettiest of his race,
And high in pedigree
(Two nymphs adorn'd with every grace
That spaniel found for me),

Now wanton'd lost in flags and reeds,
Now starting into sight,
Pursued the swallow o'er the meads
With scarce a slower flight.

It was the time when Ouse display'd
His lilies newly blown;
Their beauties I intent survey'd
And one I wish'd my own.

With cane extended far I sought
To steer it close to land;
But still the prize, though nearly caught,
Escaped my eager hand.

Beau mark'd my unsuccessful pains
With fix'd considerate face,
And puzzling set his puppy brains
To comprehend the case.

But with a cherup clear and strong
Dispersing all his dream,
I thence withdrew, and follow'd long
The windings of the stream.

My ramble ended, I return'd,
Beau, trotting far before,
The floating wreath again discern'd,
And plunging left the shore.

I saw him with that lily cropp'd,
Impatient swim to meet
My quick approach, and soon he dropp'd
The treasure at my feet.

Charm'd with the sight, "The world," I cried,
"Shall hear of this thy deed;
My dog shall mortify the pride
Of man's superior breed;

"But chief myself I will enjoin
Awake at duty's call,
To show a love as prompt as thine
To Him Who gives me all."

THE CHILD AND THE SNAKE

This is one of the many poems for children written by Charles and Mary Lamb. It is most like the work of the latter, judging by the very simple verse. The story which it tells is believed to have been founded on fact.

HENRY was every morning fed
With a full mess of milk and bread.
One day the boy his breakfast took,
And ate it by a purling brook.
His mother lets him have his way.
With free leave Henry every day
Thither repairs, until she heard
Him talking of a fine *gray bird.*
This pretty bird, he said, indeed,
Came every day with him to feed;
And it loved him and loved his milk,
And it was smooth and soft like silk.
On the next morn she follows Harry,
And carefully she sees him carry
Through the long grass his heap'd-up mess;
What was her terror and distress
When she saw the infant take
His bread and milk close to a snake!
Upon the grass he spreads his feast,
And sits down by his frightful guest,
Who had waited for the treat;
And now they both began to eat.
Fond mother! shriek not, Oh, beware
The least small noise, Oh, have a care—
The least small noise that may be made
The wily snake will be afraid—
If he hear the slightest sound,
He will inflict th' envenom'd wound.
She speaks not, moves not, scarce does breathe,
As she stands the trees beneath.
No sound she utters; and she soon
Sees the child lift up his spoon,
And tap the snake upon the head,
Fearless of harm; and then he said,
As speaking to familiar mate:
"Keep on your own side, do, Gray Pate."
The snake, then to the other side,
As one rebukèd, seems to glide;
And now again advancing nigh,
Again she hears the infant cry,
Tapping the snake: "Keep further, do;
Mind, Gray Pate, what I say to you."
The danger's o'er! she sees the boy
(Oh, what a change from fear to joy!)
Rise and bid the snake "Good-bye";
Says he, "Our breakfast's done, and I
Will come again to-morrow day"—
Then, lightly tripping, ran away.

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THE VISION OF BELSHAZZAR

The great poet Lord Byron wrote many fine poems in which he told over again with all the splendid effect of his vigorous and directly moving verse the old stories of the Bible. In the following we have the fifth chapter of the Book of Daniel compressed into six verses of poetry, full of color and dramatic power. It would be helpful to read the chapter of the Bible along with the poem here given.

THE King was on his throne,
The Satraps throng'd the hall;
A thousand bright lamps shone
O'er that high festival.
A thousand cups of gold,
In Judah deem'd divine—
Jehovah's vessels hold
The godless Heathen's wine.

In that same hour and hall
The fingers of a hand
Came forth against the wall,
And wrote as if on sand:
The fingers of a man—
A solitary hand
Along the letters ran,
And traced them like a wand.

The monarch saw and shook,
And bade no more rejoice;
All bloodless wax'd his look,
And tremulous his voice:
"Let the men of lore appear,
The wisest of the earth,
And expound the words of fear,
Which mar our royal mirth."

Chaldea's seers are good,
But here they have no skill;
And the unknown letters stood
Untold and awful still.
And Babel's men of age
Are wise and deep in lore;
But now they were not sage,
They saw—but knew no more.

A captive in the land,
A stranger and a youth,
He heard the King's command,
He saw the writing's truth.
The lamps around were bright,
The prophecy in view;
He read it on that night—
The morrow proved it true!

"Belshazzar's grave is made,
His kingdom pass'd away,
He, in the balance weigh'd,
Is light and worthless clay;
The shroud, his robe of state,
His canopy, the stone;
The Mede is at his gate!
The Persian on his throne!"

TO THE SKYLARK

One of the many poems in which William Wordsworth describes with so much truth and loving observation the characteristics of the wild creatures he saw.

ETHEREAL minstrel! pilgrim of the sky!
Dost thou despise the earth where cares abound?
Or while the wings aspire, are heart and eye
Both with thy nest upon the dewy ground?
Thy nest which thou canst drop into at will,
Those quivering wings composed, that music still!

To the last point of vision, and beyond,
Mount, daring warbler! that love-prompted strain
'Twixt thee and thine a never-failing bond—
Thrills not the less the bosom of the plain:
Yet might'st thou seem, proud privilege! to sing
All independent of the leafy spring.

Leave to the nightingale her shady wood;
A privacy of glorious light is thine,
Whence thou dost pour upon the world a flood
Of harmony, with instinct more divine;
Type of the wise, who soar, but never roam—
True to the kindred points of Heaven and home.

EPITAPH ON A HARE

How fortunate was the lot of this hare which came into the gentle keeping of the poet William Cowper compared with the fate of so many of its race! Still, it would not be possible for all the members of the great hare family to lead such pleasant lives as the poet's pet; and while such tender sentiment as Cowper awakens in us by poems like this is of very great value in softening our character, we must not let it carry us into false views of the wild life of nature.

HERE lies whom hound did ne'er pursue,
Nor swifter greyhound follow,
Whose foot ne'er tainted morning dew,
Nor ear heard huntsman's hallo!

Old Tiney, surliest of his kind,
Who, nursed with tender care,
And to domestic bounds confined,
Was still a wild Jack-hare.

Though duly from my hand he took
His pittance every night,
He did it with a jealous look,
And, when he could, would bite.

His diet was of wheaten bread,
And milk, and oats, and straw;
Thistles, or lettuces instead,
With sand to scour his maw.

On twigs of hawthorn he regaled,
On pippin's russet peel,
And when his juicy salads failed,
Sliced carrot pleased him well.

A Turkey carpet was his lawn,
Whereon he loved to bound,
To skip and gambol like a fawn,
And swing himself around.

His frisking was at evening hours,
For then he lost his fear,
But most before approaching showers,
Or when a storm drew near.

Eight years and five round rolling moons
He thus saw steal away,
Dozing out all his idle noons,
And every night at play.

I kept him for his humour's sake,
For he would oft beguile
My heart of thoughts that made it ache,
And force me to a smile.

But now, beneath this walnut shade,
He finds his long last home,
And waits, in snug concealment laid,
Till gentler Puss shall come.

He, still more agèd, feels the shocks
From which no care can save,
And, partner once of Tiney's box,
Must soon partake his grave.

LITTLE VERSES FOR VERY LITTLE PEOPLE

OLD Abram Brown is dead and gone,
You'll never see him more;
He used to wear a long brown coat,
That button'd down before.

YOU shall have an apple,
You shall have a plum;
You shall have a rattle-basket,
When your dad comes home.

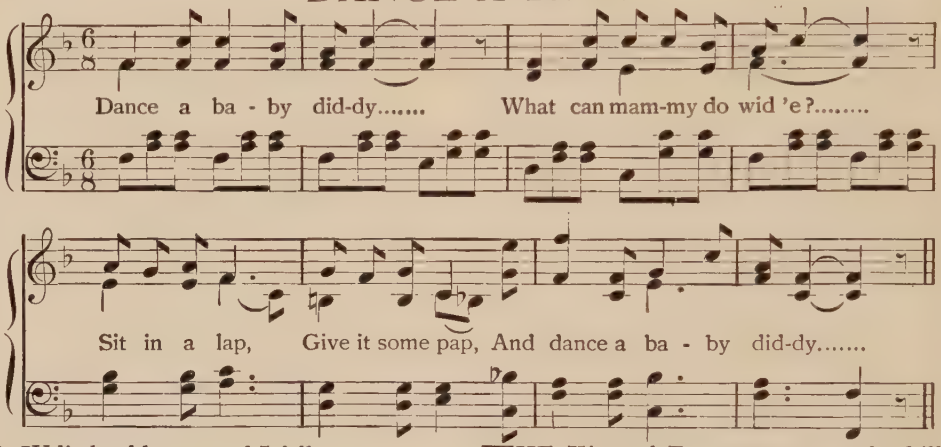
I'LL sing you a song,
Though not very long,
Yet I think it as pretty as any.
Put your hand in your purse,
You'll never be worse,
And give the poor singer a penny.

THE cock doth crow,
To let you know,
If you be wise,
'Tis time to rise.

IF ifs and ans
Were pots and pans,
There would be no need for tinkers!

THE man in the moon
Came tumbling down,
And asked his way to Norwich;
He went by the south,
And burnt his mouth,
With supping cold pease-porridge.

DANCE A BABY



MY little old man and I fell out;
I'll tell you what 'twas all about:
I had money and he had none,
And that's the way the noise begun.

THE King of France went up the hill,
With twenty thousand men;
The King of France came down the hill,
And ne'er went up again.

THERE was a little boy
and a little girl,
Lived in an alley;
Says the little boy to the little girl,
"Shall I, oh, shall I?"

Says the little girl to the little boy,
"What shall we do?"
Says the little boy to the little girl,
"I will kiss you!"

WHEN little Fred was
called to bed,
He always acted right;
He kissed Mamma, and then Papa,
And wished them all good-night.

He made no noise, like naughty boys,
But gently he upstairs
Directly went, when he was sent,
And always said his prayers.

A SUNSHINY shower
Won't last half an hour.

AS the days lengthen,
So the storms strengthen.

Opening the cacao fruits on a plantation in Trinidad.

PLANTS OF THE BREAKFAST TABLE

CONTINUED FROM 2414

WHEN we remember that the world consumes about 40 billion pounds of sugar a year we can understand the great importance of the plants producing sugar. Everywhere man has a sweet tooth, and whether he is civilized or not, whether he is white or black, he has always sought plants that give him sweetness.

Chief among these is the sugar-cane, which is another striking example of the importance of the Grass Family to mankind, for the sugar-cane is a grass, a near relative of wheat, oats, barley, corn and the other cereals. In appearance it is something like corn, but the joints are shorter and the leaves narrower. The stem often grows twenty feet high, and in its length there are many joints. The flowers grow at the top of the stem in a plume something like that of pampas grass, which is a near relative.

The sweet sap for which the plant is grown is contained in the stem, which has a tough covering, but inside is full of pith and thread-like fibres. These are saturated with sap, which is at its best in quantity and quality when the flowers are fading. If the plant is allowed to stand after the flowers have faded, the sweet sap is drawn upon by the plant itself to mature the seeds.

The sugar-cane is propagated, not by means of its seeds, but by cuttings, and many varieties of cultivated cane do not now flower at all. Any joint cut from a cane is likely to take root if planted, and often it will produce a number of canes. The top of the plant, which contains less sugar than the rest, is usually selected for cuttings for planting. After the stalk has been cut at harvest-time, new shoots come up from the roots. These are known as ratoons, a word meaning "new sprouts," and it is these that later on produce the new crop.

The size to which the canes grow is dependent on the nature of the soil, the method of culture, and the amount of moisture available. In dry, light soils the cane will not exceed six or eight feet in height. Where there is insufficient rainfall the rows of plants must be well irrigated if they are to yield a good harvest of sugar. The plants, too, must be kept well weeded, but when the cultivation, climate and soil are all good, a root will continue sending up new canes for many years in succession.

Next in importance as a producer of sugar is the sugar-beet. Many vegetables contain a considerable proportion of sugar. Scientists, realizing that the world was dependent on

tropical lands for its supply of sugar, came to ask themselves whether some plant of the temperate zones might not be cultivated and improved so as to produce sugar on a commercial basis to compete with the sugar-cane.

THE SUGAR HARVEST SCIENCE HAS GATHERED FROM THE BEETROOT

In 1809, when Napoleon prohibited the French people from bringing sugar from the West Indies—at that time the chief producing country—his subjects were unable to obtain sufficient sugar, and a stimulus was therefore given to the research work of the sugar-seeking scientists. The Germans had been the pioneers, but now the French chemists took up the search, and the result was the production of beet-sugar on a commercial scale.

After many tests the beetroot was selected as the most likely plant, and some roots were found containing as much as three per cent of sugar. The seeds of these plants were saved and planted, and gradually, by a careful system of selection, the sugar in the beet was raised until individual beets have given twenty-five per cent of sugar. Of course such roots are the exception, but whole fields have shown an average of fourteen per cent sugar.

The sugar-beet is comparatively small. The plant thrives best in a warm climate moderately damp in summer, with dry and hot weather in August and September. It is during these two months that the sugar is chiefly stored up in the root. The south of Europe is too dry, and the north too wet for profitable sugar-beet-growing, but Central Europe is ideal. In the central and western states of the United States large quantities of sugar-beets are grown, and the cultivation has been introduced into Canada, chiefly in Ontario, where good crops are produced. On page 3415 we show how sugar is made from cane and beets.

SUGAR MADE FROM THE SAP OF A TREE

Another plant producing some sugar is the sugar maple of North America, a close relative of the common maple. This is a large tree growing from fifty to seventy feet high, sometimes to a hundred feet, with a trunk sixteen feet round. The finest specimens are found in Canada, New England and in the neighborhood of the Great Lakes. The leaves have sharp pointed lobes, which gave the plant its botanical name, *Acer* (sharp).

SHRUBS THAT WOULD GROW INTO TREES IF ALLOWED

Thinking of sugar, we turn naturally to the beverages which sugar sweetens for us. First comes the Englishman's favorite drink, tea. The annual consumption of tea in Great Britain averages over six pounds per person of the population, and in Australia it is even greater—over seven pounds per person. Much less is drunk in the United States, where consumption is less than one pound for each person a year, but each American drinks about thirteen pounds of coffee a year as against the Englishman's one pound. In the consumption of both beverages Canada comes between England and the United States. Altogether 1,200 million pounds a year are produced in the world, and when we remember that this is composed entirely of the dried leaves of the plant, we can form some idea of the number of plants that must be grown to produce such a yield.

The tea plant, a near relative of the ornamental camellia, is a shrub that would grow thirty feet high if allowed to do so, but in tea plantations it is kept short to make the gathering of the leaves easy. The plant is not particular about soil, but grows best in new forest land where there is plenty of loam. The leaves are leathery and tapering, with saw-like edges, and they vary greatly in size even on the same twig. The flowers vary in color from white to deep rose, and with their yellow stamens they look like wild roses.

It is said to have been cultivated in China for five thousand years, and it is believed that in the early centuries the leaves were used only as a medicine. The plant grows wild in the mountainous country between the plains of India and China, and that is probably its home.

The tea plant is grown from seed planted in a special seed bed, and while the plants are small they are set out in well irrigated rows in a nursery, where they are carefully protected from the sun. As soon as they are strong they are transplanted, and after three years the first picking of leaves is carried out. As the branches lengthen they are pruned to induce the sprouting of new shoots, and the bearing of flowers is discouraged.

SUGAR-CANE GROWING ON A PLANTATION IN SUNNY MEXICO

A FINE CROP OF SUGAR-BEET IN A FIELD NEAR A BELGIAN SUGAR FACTORY

TWO FAMOUS BEVERAGE PLANTS

The tea plant, showing the flowers and fruits, and the leaves which are dried to make the beverage.

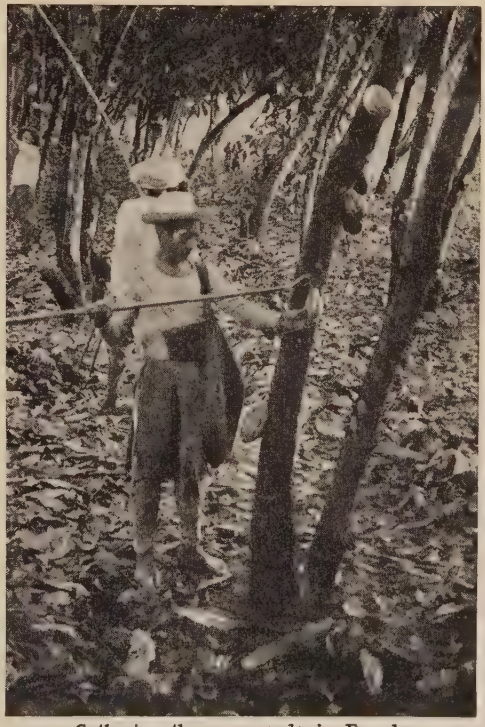
A sprig of the coffee plant with the flowers and ripe fruits known as "cherries."

COFFEE AND COCOA TREES IN FRUIT

A coffee tree with its flowers and fruits.

A cacao, or cocoa, tree in Fiji, with ripe pods.

The way in which the cocoa fruit grows.



Gathering the cocoa pods in Ecuador.

How some teas get their common names

As the plants grow older there may be as many as four pickings in a year. The various names given to the different kinds of tea are interesting. *Pekoe,* which is Chinese for "white hair," is made up of the three leaves nearest to the top of the shoots, and is so called because those leaves have down on them. *Souchong* means "small sort," and this tea is made up of the leaves below the pekoe. *Congou,* which means "labor," is so called from the fact that originally in China it consisted of leaves of the third picking, and much labor was required for its production. *Bohea* is the name of a mountain range in China where an inferior black tea used to be grown. On page 761 we show you how tea comes to the table.

Coffee has become a very important beverage plant. Brazil is the chief coffee-growing country. The plant is a shrub, and the upper part is divided into long trailing branches. The smooth leaves are three or four inches long and are evergreen. They closely resemble the leaves of the laurel grown in our gardens. The white flowers breathe out fragrance, and the plant blooms three times a year, bearing both flowers and fruits at the same time.

Flowers that shine in the garden like stars in the sky

The coffee seed is planted in sheltered places and is carefully screened from sun and wind. After the plant appears above ground it is transplanted to a nursery, and is still carefully shaded and protected from winds. It is also carefully watered, and gradually the stem lengthens. Then the plant is hardened by the removal of the protecting shade, and is taken up on a spade with as much soil as possible and planted out in the fields. When the shrubs are in blossom the white flowers make the plantation a beautiful sight. On page 2177 we show how we get coffee.

Another very important beverage plant is the cacao, from which we obtain cocoa and chocolate; cocoa is our way of spelling the Spanish name for the plant, cacao. Like tea and coffee, cacao is an evergreen. Two or three generations ago it had scarcely been heard of, but now every child knows and loves the product in the form of cocoa and chocolate. The plant is a native tree of the Amazon forest, but it has been carried all over the tropics, and is now cultivated in many lands.

The botanist who called cocoa the food of the gods

When the great botanist Linnæus was asked to give a name to this plant he was offered a cup of chocolate as a sample of the fruit. So delighted was he with the flavor that he at once called the plant Theobroma, which means "food of the gods," and that has been the scientific name for the plant ever since. We often hear cocoa spoken of as the food of the gods to-day, and now we know how it was so named.

When the young trees are planted they must be shaded at first, but soon grow strong. The cacao tree, which is very handsome, grows from ten to forty feet high, and bears fruit from its fourth to its thirty-sixth year. The flowers are small, and the fruit is a yellowish or reddish brown pod, from six to twelve inches long, tapering at both ends with a pulpy mass inside containing from twenty to thirty hard seeds clustered together in the centre like those of a watermelon. It is these seeds which are roasted and ground up to supply us with cocoa and chocolate.

The seeds used as money by the natives of Mexico

Curiously, the pods grow out of the main trunk of the tree, and out of the older big branches, and not like the fruits we know so well that hang on slender young stalks only. Those who gather the pods have to be careful not to cut the circle of buds round them set close to the stem, for these, if left, develop into new pods. The seeds of the cacao tree were used by the Aztecs of Mexico as money, and still in some parts they are sometimes used in the same way.

One other beverage plant grown on a large scale is maté, or Paraguay tea, so called from the South American country in which it is found. It is not related to the tea plant, but is really a holly, and both the wild and cultivated plants are used. The branches are gathered and dried over fires, and the leaves are ground up into powder for making tea. In Paraguay the average consumption per person is thirteen pounds, but Europeans have to acquire the taste. At first they find it very unpleasant, but later on get to like it quite well.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 2613.

The delta of the Nile.

The delta of the Mississippi.

THE RIVERS AND THE SEAS

CONTINUED FROM 2422

THE rivers are at once mountain-eaters and mountain-makers. They eat away the mountains and pour them as mud into the sea, and the sea-mud rises again as mountains.

Nearly all the volcanic lava of the earliest crust of the earth has been eaten away by rivers. Volcanoes as high as Aconcagua have been washed into the sea, and lava plains wider than France have been completely swept away.

But for the hard work of rivers New England, California, British Columbia, and other parts of North America would to-day be bristling with volcanoes, and cut across by lava streams. The Appalachians, the Ozarks, the Sierra Nevadas are all river-mud, and now the rivers are again wearing down these mud mountains, as once they wore down the volcanoes. Of course, the power in the rivers is really the power in the sun and the power in the earth itself. It comes from the drawing-up of the water into the clouds by the sun, which let it fall again to sea-level through the rivers. A river may indeed be regarded as a great two-handed fret-saw—at one end the white arms of the Sun pulling, at the other the black arms of the Earth; at one side the giant of Heat, at the other side the giant of Gravitation.

Now how long does such a fret-saw, in such strong hands, take to wear down a mountain into sawdust? Long ages ago, when the water was possibly steaming hot—much hotter than boiling—it must have eaten away the rocks like strong acid. Since the volcanoes were very steep and high, the torrents and cataracts of steaming white water must have had tremendous power. Even though the basalt and the granite are hard rocks, they were probably melted away more quickly then than limestone and sandstone melt to-day. It has been calculated that, in order to lower by one foot the country it drains, the river Po has to work 700 years; the Ganges 1,880 years, the Yellow River 1,500 years, the Mississippi 4,920 years, the Danube 7,000 years. The time varies, of course, with the rapidity of the river and the kind of country over which it flows. In the same way it has been found out that, at the present rate of wearing-down, all the land would be down to sea-level in less than five million years.

We have given on page 630 some illustrations of the amount of mud the rivers carry down. Here are a few more. The Ganges and the Brahmaputra together discharge every year into the Bay of Bengal enough mud to make 336 pyramids each as big as

the Great Pyramid of Egypt. The Mississippi discharges enough mud to cover a square mile 268 feet deep—enough to bury a great city. The Rhine carries yearly into the sea enough carbonate of lime to make 332,000 million oyster shells of average size. The St. Lawrence carries down an immense amount.

Naturally, not all the mud brought along by rivers becomes mud on the floor of the sea. A good deal of it is deposited at their mouths, and in this way rivers make fruitful plains. Egypt and the Netherlands are made of river-mud, and one of the most important provinces of China, containing more than a hundred thousand square miles, is made of the mud of the Yellow River. The five greatest rivers in the world are: the Amazon, 3,800 miles long; the Congo, 3,000 miles; the Nile, 3,500 miles; the Missouri-Mississippi, 4,200 miles; and the Yangtse, 3,400 miles. Of these the Amazon is by far the greatest, for it has 29 other great rivers as tributaries. The Amazon drains 2,700,000 square miles, an area less than twice as large as that drained by the Mississippi, but brings to the Atlantic five times the volume of water. With all its branches, it would more than reach around the world.

WHY THE OLD EGYPTIANS WORSHIPED THE RIVER NILE

Even when we think of rivers simply as makers of mud and mountains, we are astonished at the greatness of the part they play in the world. But they are much more than this; they are also water-carriers. If rivers did not collect and carry water, great parts of the world would not be fit to live in. On the banks of great rivers men made the first great cities, for with the water the river brings fertility. In Egypt the Nile not only brought the mud and made the land, but it continues to water it, and a low Nile means a famine. Little wonder the Egyptians worshiped the river as a god!

And rivers carry more than water: they carry trade and men. They are highways as well as builders. Before the days of railway trains and airplanes and ocean liners it was the river boats that made trade and travel possible, and even today the rivers are the chief or the only roads in some countries. Think what the Missouri-Mississippi has meant to America! It is only 4,200 miles long, but, with its tributaries, it offers about 9,000 miles of navigable water. Think of the Amazon! What should we know of Brazil without it? With its tributaries it offers about 20,000 miles of navigable water, and brings tremendous supplies of rubber and hides and cacao and timber within the reach of civilized lands. Think of the Hudson and the St. Lawrence and what they mean to America and to Europe! Along those great water highways are shipped huge quantities of iron ore, coal, grain, timber and flour. Think of the trade on the Rhine, the Thames, the Danube! Think of all the great cities built on rivers—London, Paris, Berlin, Vienna, Budapest, Quebec, Montreal!

THE VALUABLE PART PLAYED BY WATER POWER IN MODERN LIFE

Even yet we have not enumerated all the services rivers render the world. They have power to grind down mountains, but they have also power to grind corn and to work machinery. The soil made by the Danube is perhaps the richest soil in Europe, and all along that river are corn mills grinding the corn grown on its rich silt. Nor must we forget the power given to man by torrents and waterfalls. Most of Switzerland is lighted by electric light provided by power from its mountain streams. Every village in the Rocky Mountains is so lighted. In Sweden the waterfalls are at work making nitrates from the nitrogen of the air; and the Niagara Falls, and the Mississippi at Keokuk, Iowa, are already harnessed. Similar schemes are proposed for streams in all other continents.

We cannot leave the rivers without saying a few words about their relatives the lakes. Lakes are great basins filled with still water, and most of their basins have been formed by the bending up and down of valleys.

THE HUGE SALT-WATER LAKE THE OCEAN LEFT BEHIND IT

The largest lake in the world is the Caspian Sea. It is a salt lake, and was once part of a sea which stretched up to the Arctic. In itself it is almost large enough and deep enough to be a real sea, for it covers 170,000 square miles and is 3,000 feet deep in places. Lake Superior, a fresh-water lake, is second in size, but it is only one-fifth the size of the Caspian Sea and one-third as deep. Third in size comes Lake Victoria Nyanza, and then, in order, the Aral Sea in Asia, Lake Michigan and Lake Huron.

Lakes give great beauty to the landscape, and the big lakes in North America and Africa are of importance to trade; but lakes are neither so beautiful, nor so interesting, nor so important as rivers.

Now let us come to that marvelous accumulation of salt water called the sea. If the globe of the earth were round and unwrinkled, the water of the sea would be enough to cover it all over to a depth of two miles. But, fortunately for us, the same fierce forces that made the steam also made the volcanoes and broke and crumpled the crust of the earth, so that there were big hollows to hold the water. Some people think that the specially big hollow now filled by the Pacific Ocean is the remains of a hollow made when the moon was half torn and half tossed out of the soft crust, and that is at least a very interesting idea. Anyhow, the wrinkling and folding and tearing of the earth made beds for the ocean.

THE ALPS AND THE HIMALAYAS THAT ONCE LAY UNDER THE SEA

As we may readily believe, the shape and extent of the oceans have altered many times since they first were big enough to be called oceans. We know that mighty volcanoes and volcanic continents were worn down by rivers; we know that the Alps and the Carpathians and the Himalayas rose from the bottom of the sea. It is quite certain that the sea and land had a very different distribution in the early world, when the trilobites flourished in the water and great reptiles ruled the land. At one time all India and most of Europe were under the sea.

To-day we find that there is more than two and a half times as much sea as land —over 141 million square miles of sea and 55 million square miles of land. On the average, also, the sea is much deeper than the land is high, the average depth of the sea exceeding 12,000 feet and the average height of the land being only 2,250 feet. The bulk of the sea-water is more than thirteen times the bulk of the dry land.

THE OCEAN THAT EQUALS ALL THE DRY LAND IN THE WORLD

The depth of the sea is a very important matter for us. If it were 600 feet deeper, many lands would disappear. If it were 600 feet shallower, England and France, Asia and America, Tasmania and Australia would be united, and it probably would be possible to travel on foot from Sydney to China and from China to Alaska.

The two greatest oceans to-day are the Pacific and the Atlantic. The Pacific covers at least as great an area as all the dry land of the world. The greater part of this ocean is from 12,000 to 18,000 feet deep, and there are some places so deep that they would more than cover Mount Everest. The greatest known depth is 31,614 feet, nearly six miles. The Atlantic Ocean extends over more than 30 million square miles, and is much shallower than the Pacific, with an average depth of only 10,200 feet. Its greatest known depth is over 27,000 feet.

As we know, the sea is very salt. In every 1,000 parts it contains more than 27 parts of common salt and 8 parts of salts of lime, magnesium and potassium. All these salts have been carried into it by rivers. Though some rivers wear down the rocks very rapidly, it must have taken the rivers about a hundred million years to transport so much solid matter. The amount of salt in the sea is most astounding. If all the salts in the sea could be taken out and collected, there would be enough to cover all the dry land 400 feet deep, or to bury the Himalayas.

THE MYRIADS OF SHELLS THAT COVER THE OCEAN FLOOR

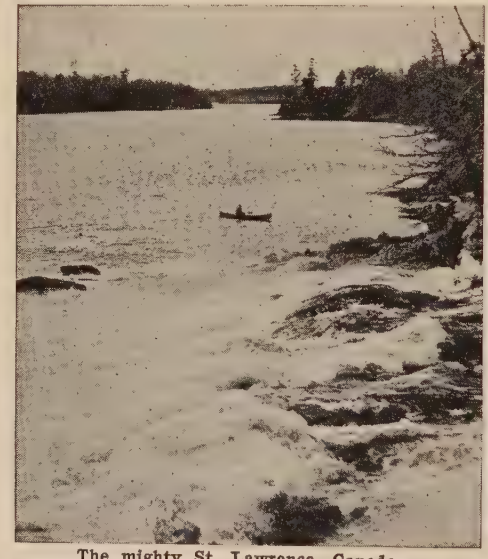
The sea also contains dissolved in it the gases carbon dioxid, oxygen and nitrogen. Without oxygen there could be no living creatures save air-breathing animals, like whales, in the sea.

The lime-salts of the sea are used by shell creatures to make their shells, and as the soft bodies are dissolved after their death and their shells remain, the ocean floor becomes covered with limy shells, forming what is called ooze. Most ooze consists of tiny shells of the minute shelled creatures called globigerinæ, and is known, therefore, as globigerina ooze. It looks like pinkish or grayish mud, and it is estimated that more than 47 million square miles of ocean floor are covered with this ooze. It requires about ten thousand globigerina shells to fill a box one inch square, yet so numerous are these little shells that many mountains are built of them, and they must be lying thousands of feet deep in some parts of the ocean.

In other parts of the sea floor there is an ooze made up of the glassy shells of the tiny plants known as diatoms. Vast

WIDELY SEPARATED RIVER HIGHWAYS

The river Isis at Oxford frequented by undergraduates and dons.



The mighty St. Lawrence, Canada.

State barges on the Ganges, India.

The Zambezi River, above Victoria Falls.

Trading boats on the Nile, lateen sails.

ENORMOUS RESERVOIRS OF POWER

The Victoria Falls, on the Zambezi River.

The rushing waters of the first Nile cataract.

The lower Yosemite Fall.

Tama-Dare Waterfall, Japan.

Sutherland Falls, New Zealand.

The wonderful falls of Niagara.

The great Ripon Falls, on the Nile.

Photos by the Canadian and New Zealand Governments, and Mr. H. G. Ponting.

areas of the ocean bed are covered with a red clay containing the teeth of sharks and the ear-bones of whales.

All these myriads of little shells in the sea simply show the extraordinary amount of life the sea contains. It is probable—indeed it is certain—that the sea is more thronged with living things than the land.

THE GIANT FORCE OF THE WAVES BEATING AGAINST OUR COASTS

But we do not see the living things of the sea unless we go down in diving-suits, and the features of the sea that we notice most are its waves, its tides and its currents. With its waves man has had to battle and is battling still; for they eat away his coasts and sink his ships. The power of the waves is tremendous; but they never reach the height commonly supposed, and very few waves exceed fifty feet, though the spray may break nearly two hundred feet high. At Dunbar, in Scotland, the breaking waves of a stormy sea were found to exert a pressure of nearly 8,000 pounds for each square foot, and waves as heavy as that can toss blocks of stone and boulders thirty or forty tons in weight. Yet, in spite of its strength and violence, the rivers wear away the land much faster than the sea.

The tides of the sea are not so violent as its waves, but they are more important. We have already seen how they are caused by the tug of the sun and the moon—how the moon, as it goes round the earth, raises the water under her, and we need therefore say little more about the tides here, except that the rise and fall offers a great source of power which man is busy trying to harness. To-day we use the water raised by the sun to run our mills; to-morrow we may use the tides raised by the moon. Even now, we use the tides every day. Often big vessels could not enter harbor without the help of the moon, which raises the level of the water at certain times, enabling them to enter.

THE GREAT SEA-RIVER WHICH BRINGS WARMTH TO US FROM MEXICO

In most parts of the coasts of the world the tides do not, as a rule, rise very high; but in Cardiff docks there are sometimes tides over 40 feet, at the Straits of Magellan over 60 feet, and at the Bay of Fundy over 70 feet.

Besides waves and tides, the sea has great currents which directly and indirectly affect the climate of the world. The one in which we are chiefly interested is the Gulf Stream. Like all the great currents, it is produced by a constant wind. It sweeps out of the Gulf of Mexico, and is carried by the south-westerly wind across the Atlantic. At first it is like a great sea-river forty or fifty miles broad, and flows at the rate of four or five miles an hour; but as it crosses the Atlantic it slows down, gets thinner, and divides into three currents, one going toward Iceland, one toward Ireland and Scotland and Norway, and one toward Spain. It is really the warm wet wind, sweeping along the current and going with it, that brings the warmth to neighboring countries. So much heat altogether does it bring that, if concentrated at one point, the heat would melt a mountain of iron into a river as mighty as the Mississippi.

This is perhaps the greatest, and certainly the most important, current of the sea, but there are many other great currents which affect the climate of the world. So the tempestuous, tossing sea, which seems almost an utter chaos as we look at it, has yet regular and never-ceasing movements running through it—rivers that keep their appointed course even without beds or banks.

In the quiet water between the swirls of these currents seaweed often collects, and within the coils of the great lasso of the Gulf Stream there are islands and patches of seaweed which together cover an area nearly as large as Europe. This vast accumulation of seaweed is known as the Sargasso Sea, in which Columbus was becalmed, and which made his men despair of ever reaching land.

WHY ALL OF US SHOULD LOVE THE SEA

The part the sea has played and is still playing in the history of man is immense. Not only does it modify and regulate the climate of the whole earth by its currents and by the heat it stores, but it has affected the whole development of civilized man. It was the sailors who discovered India, Australia, the Cape of Good Hope and America. It was the ships that made possible the settlement of the New World by whites. The sea brings to us the products of all ports of the world, and enables us to send to them the things we make or grow.

THE NEXT STORY OF THE EARTH IS ON PAGE 2663.

Dam across Ganges Canal at Dhanauri, India.

MAKING THE DESERT BLOSSOM

CONTINUED FROM 2453

THOUSANDS of years ago men knew that they must have water or die. Land without water is but a parched and arid wilderness, and the truth of this is quickly brought home to dwellers under a glaring sun and in shimmering heat. The greatest blessing for which the ancients longed was to dwell "in green pastures by living waters." Their greatest misery was "a dry and thirsty land where no water is." When the Preacher in the Book of Ecclesiastes speaks of "the pitcher at the fountain, or the wheel broken at the cistern," we have a sad picture of what will follow in the hot and dust-blown countries of the East. For he continues, then "man goeth to his long home." Today the name given by the Arabs to Damascus is "Earthly Paradise," because of its flowing streams and luxuriant vegetation.

In many of the countries bordering the Mediterranean; to the east, in Mesopotamia, India and China; to the west, in Mexico and in South America, men learned very early to make use of the water available to them. In many cases the streams coming from mountain regions would be swollen at certain times of the year by rains or melting snow. Some of these peoples learned to guide this overflow by rough dikes and rudely constructed ditches, and later built canals to bring the water out to land which would not be overflowed naturally. Others had even more skill and understanding, and stored their waters for time of need in the dry season. They built great walls across their rivers, thus constructing reservoirs or storehouses for the water. About two hundred years before the birth of Christ one of these great storage dams, built partly of hewn stone across the valley of Saba in Arabia, broke down, and eight tribes had to leave the district which the water had before supplied.

The sculptures and paintings of Egypt show the peasant raising up water from the Nile four thousand years ago. By a simple plan of raising water and pouring it over the fields thousands of acres are watered every year in India. The simplest and earliest form of water-raising machinery is a pole with a bucket at one end balanced across a beam and a weight at the other end. All along the Nile banks, from morning to night, through many centuries, brown-skinned peasants have been working these buckets to raise the water on their lands. We may also see two men raising a shallow bucket by means of strings. Everywhere in Egypt and India, and in Japan, too, can be seen a rude water-

wheel, with pots on an endless chain around the rim, worked by cattle or by men. China has long practiced irrigation, and is increasing the quantity of land to be watered.

THE COUNTRY WHERE IRRIGATION IS MOST HIGHLY DEVELOPED

Have you ever wondered why the Italians are such wonderful growers of vegetables and fruits? One of the reasons is that they have in the northern provinces of their country the most highly developed system of irrigation in the world. If you look at a map of Italy you will see that its northern end is encircled by a lofty range of mountains called, by a general name, the Alps. The rivers of this part draw their waters from the never-failing glaciers of the mountains, which melt when warmer weather begins. Thus the supply is available in summer when it is most required. It is so regular that the people are able to count on so many thousand cubic feet per second through so many months.

A great Italian statesman and patriot, Count Cavour, about the middle of last century organized a complete system for distributing this water. In each parish in the district is a council composed of all landowners who irrigate. Each council sends two members to what may be called a "water parliament," which manages the whole scheme. The irrigated area is divided into districts, in each of which is an overseer and a staff of watchmen to see to opening and shutting of the gates which deliver the water into smaller channels. In November every year it is decided in the water parliament how much water is to be given to each parish in the following year, and this depends on the number of acres of each crop to be watered. The Italian farmer submits very loyally to whatever regulations are made, though sometimes if he opened a sluice during a dark night and allowed the water to run for a few hours he might double the value of his crop. In Spain irrigation is practiced to a considerable extent.

A LAND WHERE FAMINES RECUR REGULARLY

Parts of India are nearly rainless, and there can be no cultivation without irrigation. Other parts have a heavy rainfall at certain seasons and are rainless the rest of the year. Rice, a very valuable crop, is almost a water plant and needs a constant supply passing over it. Corn and millet, which form so large a portion of the peasants' food, can be raised without irrigation in ordinary years, but about every eleven years comes a season of drought. These droughts have been followed by terrible famines in which thousands of people have died. Since about 1878, which saw the end of a very bad famine, there has been a large sum of money set aside every year to provide for irrigation and reservoir works. The Chenab Canal, the largest in India, which waters the province of the Punjab, has turned land that was practically desert into a thriving agricultural region inhabited by prosperous peasants. Similar canals stretch like a network from the sacred river of the Hindus, the Ganges, upon whose banks lives a teeming population. Recently important irrigation works have been established in Australia and in South Africa. Australia particularly has a large extent of land which can be rendered fertile by the application of water.

HOW THE WATER SUPPLY HAS BEEN CONTROLLED

In much of the western half of North America profitable farming depends upon an artificial supply of water. In many sections less than twenty inches of rain fall each year. An inch of rain means enough water to cover flat ground to that depth. In Arizona and New Mexico remains of water works have been found which date from very early times. When the Spanish explorers came to the Rio Grande in the first half of the sixteenth century they found the native inhabitants practicing irrigation. The early Spanish missions also built works in that valley sometime during that century, and this, so far as is known, was the beginning of modern irrigation in the United States. Some of the works made by the early Spanish settlers have been in use almost up to the present time.

In 1847 the Mormon settlers began to irrigate the Salt Lake Valley, Utah. This was the first irrigation done by English-speaking people in the country. About twenty years afterward the work was taken up in Colorado and California. From these beginnings the practice gradually spread to the other parts of the arid West. Fifty years later the census showed about seven and a half million acres under irrigation, which for the most part was brought about by farmers joining to plow out or dig ditches from the rivers. There

THE LARGEST WATER-WHEEL IN THE WORLD

This huge water-wheel at Hamah, in northern Syria, 75 feet in diameter, is the largest in the world. The wheel runs without stopping day and night all the year round, and is used to raise water in buckets to the arched stone aqueduct for irrigation purposes. In ancient times the town was called Hamath, and was the capital of a Syrian kingdom which the kingdom of Israel touched in the time of Solomon.

were also some big structures for the sale of water, such, for example, as the Sweetwater dam of South California and the Arizona canal. Since 1902, when the United States passed the Reclamation Act, irrigation has made rapid progress aided by Government money.

THE HIGHEST DAM IN THE WORLD IS IN IDAHO

In 1915 the highest dam now existing in the world was completed on the Boise River in Idaho. Dam and reservoir took five years to build. The Government invested over $12,000,000 in the scheme, and within twenty years the farmers will have returned this sum. Payments on all Government projects are used to build other reservoirs. Because of the supply of water now available, about 235,000 acres of barren sagebrush desert will be turned into gardens, orchards and farms, and the crops on many thousands of acres will be saved each year. The Elephant Butte Dam across the Rio Grande in New Mexico, the North Platte project in Nebraska and Wyoming, and the Roosevelt Dam across the Salt River in Arizona, are also important works. In all there are about thirty important projects completed and under construction, and thousands of miles of irrigating canals and ditches have been constructed.

The largest irrigation project in North America, however, is the Canadian Pacific, Eastern Section. About three miles south of Bassano, Alberta, a dam has been constructed across the Bow River at Horse Shoe Bend. The dam proper is 7,000 feet in length, of the Ambursen reinforced concrete type, with a water-tight concrete barrier at the water surface.

Already nearly 900,000 acres are under irrigation, and the total length of the irrigating canals and ditches is over 5,000 miles. The total area in the section which may be irrigated is over 3,000,000 acres, and the cost of the project was over $17,000,000. The Assouan project in Egypt, described below, is the only one which is larger, and the only one in America which approaches it is that which depends upon the Roosevelt Dam across Salt River, Arizona.

With irrigation, agriculture in an arid region yields larger returns from an area than in rainy regions, because daily sunshine is the life of plants. If we can supply moisture at proper times and in the exact quantity, we can make the values of ordinary farm crops from 50 to 75 per cent greater than in an equally well-farmed part of the humid region.

In Africa, under a pitiless, burning sun, rolling away into distance for ever and ever, lie over three and a half million square miles of desert—the Sahara, as big as all Europe. Half stifled by the dust, half blinded by the glare, and half frightened by the terror of this immense waste of the earth's surface, generations of men have gone by, leaving it there as a miracle of God, something that passes the power of man to alter or the wit of man to comprehend. The Nile overflowed its banks and left a coating of mud over a part of this desert. The people threw seed upon this slime and waited for it to grow. But when the Nile failed to overflow its banks, famine came upon the land, and men died like flies.

The engineer came to the desert, looked at it, looked at the mighty Nile, and then said: "This can be altered!" While the desert fainted for moisture, the Nile was carrying millions of tons of water to the sea. The engineer said: "I will stop that waste of water!" And then followed one of the mightiest works ever undertaken by the children of men. Two great dams were built across the Nile. There was a woeful outcry from sentimental travelers. "You will drown the beautiful ruins of Egypt; you will spoil the wonder of her scenery!" But the engineer worked on. His object was, not to guard the pillars of an empty temple, but to convert ruin into life. And this he has accomplished. He has made the desert blossom and bring forth food for the use of man.

THE ROMANCE OF THE BRITISH ENGINEER IN THE LAND OF THE PHARAOHS

Ten thousand descendants of the ancient Egyptians worked under British instructors in the building of these dams, chattering in their ancient language as they carried steel forged in modern England. What an amazing romance it all is! Even yet there is more land in Egypt which can be watered.

Perhaps it is best for the world that the engineer should not be honored as a great hero. But we do well to remind ourselves sometimes how enormous is the debt which civilization owes to this quiet, thinking man of action, who makes the earth a happier and a far more comfortable habitation for mankind.

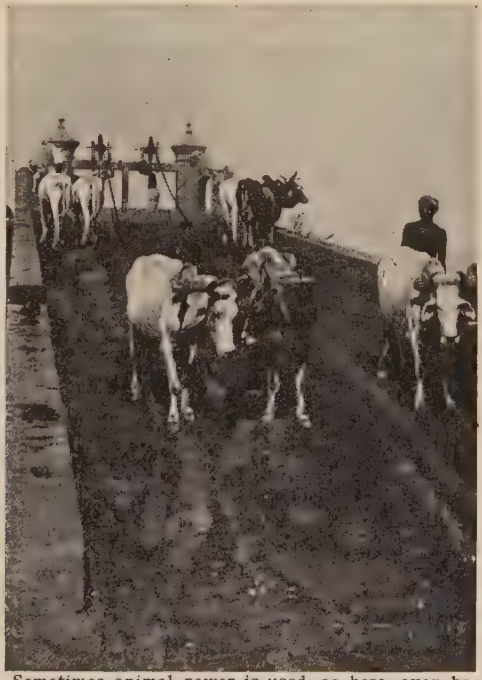
THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 2653.

THE OLDEST WAYS OF IRRIGATION

A peasant in India raising water by an arrangement known in that country as a denkli. In Egypt this contrivance is called a shadoof.

In the Japanese rice-fields much of the irrigation is carried on by means of treadmill water-raisers, operated in the way shown in this picture.

Here is another curious way of raising water by treadmill which is often practiced in India.



Sometimes animal power is used, as here, oxen being driven down an incline to haul up water.

The picture in the lower left corner is copyrighted by Underwood & Underwood, New York.

PREPARING TO DISTRIBUTE THE WATER

A great dam is only one part of an irrigation scheme. The water must be carried where it is required. The channel of the Murrumbidgee irrigation scheme in Australia, 138 miles long, is being hollowed out.

Where the ground is suitable, great mechanical excavators are used to dig the irrigation channels.

Where timber is plentiful wooden flumes, or pipes, are often laid in the trenches to carry the water, as is being done here in British Columbia. Iron rings inside and outside keep the planks in position.

THE WATER IS CARRIED TO THE FARMS

Through the smaller channels the water at last reaches the farms that need it. This is a photograph of a settler's home on the banks of a small irrigating canal in the Murrumbidgee territory of Australia.

Here is an irrigating channel in Canada, where the water is used not only for feeding the growing crops, but also as drink for the flocks or herds on the farm.

In the fields the water runs in narrow trenches.

Here we see a pumping station in Australia.

TAPPING THE UNDERGROUND WATERS

An artesian well in Australia.

Sluice-gates in California.

Sometimes the water is carried to the trenches through wooden troughs, as shown here. This walnut orchard in California was once a stretch of barren land on which nothing useful would grow.

Photo. W. T. Oliver.

The Bassano irrigation project near Bassano, Alberta, is next to the largest in the world. This dam across the Bow River makes a reservoir which already irrigates nearly 900,000 acres, and much more will in time be brought under irrigation. The dam is 7,000 feet long and 350 feet thick at the base.

The chief food of the Filipinos is rice, and most varieties require a great deal of water. Here you see young stalks being planted in the mud under water, which will later be drained off. The natives have practiced irrigation for a long while. Though they have built no great dams, their simple works answer the purpose for which they were constructed.

THE GIANT RESERVOIRS OF AMERICA

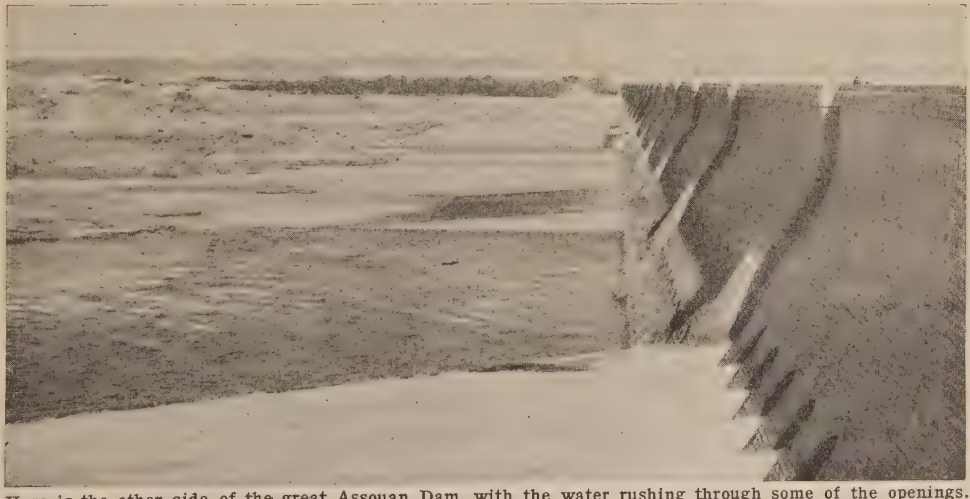
This is the great Roosevelt Dam across the Salt River in Arizona.

The Arrowrock Dam in Idaho, about 350 feet high, is the highest in the world.

GREAT IRRIGATION WORKS OF EGYPT

Here we see the great masonry dam at Assouan which holds up the flood waters of the Nile.

The stored-up waters are released as required through great openings in the dam, and the doors of the openings are so massive that enormous machinery is required to open and close each one.



Here is the other side of the great Assouan Dam, with the water rushing through some of the openings.

THE DESERT BLOSSOMS AS THE ROSE

The desert of the Rio Grande, in New Mexico, as it appeared before any irrigation works were begun. The soil is fertile, but the climate is arid, and nothing but useless scrub and cactuses could grow there.

Here is the same place after the great Rio Grande irrigation works had been carried out.

A fruitful almond orchard flourishing in Colorado where formerly there was nothing but arid wilderness.

IN JAVA RICE IS GROWN IN TERRACED FIELDS WHICH ARE ABUNDANTLY IRRIGATED

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BAFFIN'S BAY, SHOWING NORTHERNMOST INHABITED HOUSE IN AMERICA

ALBERT HARBOR, ALBERT LAND, IN THE ARCTIC REGIONS

Eskimos in their kyaks returning from a walrus hunt.

OUTPOSTS OF CANADA

YOU will perhaps think it very strange that nearly two-thirds of our country is almost unknown to-day, and is inhabited only by bands of wandering Indians and a few Eskimos. Yet northern Canada is an unexplored country in a sense which is not true even of Africa, and this for several reasons. The courageous explorer in the northlands has to meet a very cold climate for the larger part of the year, and it is possible to live in such a climate only by being well provided with food, shelter and fuel.

But in northern Canada the food supply is very uncertain, as you can never tell where the wandering bands of caribou may be, and in the depth of winter many go south. Fish can usually be obtained, but only at certain places, and even there they sometimes fail the starving fisherman. Fuel is another very important necessity, and over a large part of the country northwest of Hudson Bay it is wholly lacking.

You may say: "Why not leave the work of exploration until warm weather comes?" First, because the summer lasts for such a short time—probably not more than two or three months—and in that time it is possible only to touch the fringe of the unknown country. And in summer the bogs and swamps are nearly or completely impassable, whereas in the cold weather King Frost makes them dry and firm.

When you look at the map in school you see a great triangular block of land between Hudson Bay on the west and the Atlantic Ocean on the east. If the map is up to date, this huge country will be included in the province of Quebec, of which it now forms a part. The true name is Ungava, or New Quebec, as some people now prefer to call it. Others call it Labrador, or the peninsula of Labrador. It is truly a peninsula, as your map will show you; but it is not Labrador, for Labrador is the narrow strip of land along the Atlantic side of the peninsula and belongs, not to Canada, but to Newfoundland. You will find a description of the true Labrador in the article on Newfoundland.

In 1891 Mr. Packard, the well-known naturalist, wrote: "The Labrador Peninsula is less known than the interior of Africa or the wastes of Siberia." Since that time several exploring expeditions have told us something about the interior of this huge territory, but what Mr. Packard wrote in 1891 is still true to-day. However,

the call of the unknown has a great attraction for many men, who do not hesitate to risk life and health to learn its secrets. One of them, Mr. Hubbard, lost his life from starvation in Ungava, but this did not stop his old friend and his wife from continuing the search.

We learn from the writings of the government geologists and others that Ungava is a table-land about two thousand feet high and that it slopes toward Hudson Bay and the Arctic Ocean. The Atlantic coast is much higher, and the rivers which flow into the Atlantic have worn deep ravines through the rocks and earth. These ravines are sometimes hundreds of feet deep and are very beautiful. The whole interior of the country is covered with a network of rivers and lakes.

This fact makes it possible to use canoes, but, as many of the rivers are shallow and very rapid, the canoes have to be carried for long distances. And the great number of rivers makes it easy to get lost, for such maps as we have are poor, and a person is quite likely to go astray in a country where the rivers and lakes are so numerous and look so much alike. Then, too, unless you carry with you enough food to last your journey, you may starve to death, for wild animals cannot be depended upon for food, and every fisherman knows that fish cannot always be caught.

THE PEOPLE OF UNGAVA

There are about 14,300 people, of whom 3,500 are Indians, 2,000 Eskimos and 8,800 are white. In the winter the Indian and Eskimo live by hunting and trapping, but they generally move toward the coast for fish during a few weeks in the summer. The traps of one man may extend for a distance of fifty miles over the snowy wastes, and it often takes him several days to visit them all. Many a time he finds nothing but bits of fur to reward him for his toil: the wolverine has stolen a march upon him.

The Indians' great source of food has always been the caribou, but unfortunately these are fast being exterminated. The rather stupid animals move north in the summer and south in the winter. The Indians hunt them while they are on their journeys. Then they travel in large herds, which are most numerous at the shallow parts of the rivers which they must cross. Here the Indians meet them, and great is the slaughter. But the real work of the Indians is trapping the fur-bearing animals, the skins of which they carry to the coast in the summer and sell to the fur-traders.

Will Ungava ever be a white man's land? It is hard to say. The soil is not good for farming, and the winters are very cold, but there are valuable forests, and there may be minerals. The shore fisheries along the coast of Hudson Bay are very valuable and likely to be the first of the natural resources developed. Trout, whitefish, cod and salmon are the most important fish.

THE YUKON TERRITORY—THE GOLD COUNTRY

In the extreme northwest of Canada a large territory, or district, in 1898 was separated from the Northwest Territories and is now known as the Yukon Territory. Here we find the famous Klondike mining camp, so well known only a few years ago for its valuable gold deposits. This country is most easily reached by boat from San Francisco, Seattle or Vancouver, to Skagway at the head of the Lynn Canal, thence by rail to White Horse, and thence down the Yukon River to Dawson City, the most important centre in the territory.

At the height of the gold rush this was a busy little town, but with the decrease in the gold output it has lost a great many of its people, as has also the whole territory, whose population of over 27,000 in 1901 had decreased to 4,157 in 1921. At first the gold was obtained by washing the soil in and near the river beds, a method known as placer mining. Now real mines are being sunk, and though there is less waste, the yield is much less, while the cost at first is greater and the miners do not make so much money as in the early days.

So, for the time being, the story of the Yukon has become to a great extent a story of the past—a past when fortunes were made in a few weeks and still larger fortunes were lost forever. Such is nearly always the tale of mining countries.

Of far greater interest is the chance that some day this territory may offer other and better methods of supporting the people who may go there. Here, as in the case of Ungava, we have to confess that we know little of the other kinds of wealth which the country may have.

SUMMER IN THE FAR NORTH

While some of the land in the Yukon is fertile, there are also scenes like this. Note the seams of rock of a different kind which have been forced up by some convulsion of nature. It looks as if an avalanche has swept this side of the mountain, whose summit is piled deep with snow.

Turn to your map of the Northwest Territories and look for the Great Slave Lake. Just where the Great Slave River flows into it is Fort Resolution, a post of the Hudson's Bay Company. The goods which the Indians are bringing from the landing will be exchanged for furs. Photos, Brown Bros.

We do know, however, that the southern part has a milder climate in winter than has the interior of Ungava, for while Ungava is washed on its northern and eastern borders by the cold Arctic currents and on the west by the stormy waters of Hudson Bay, the Yukon is blessed with the warmer winds from off the great Pacific. The western coasts of all the continents are warmer than the eastern.

The southern part of the Yukon, or a large part of it, is neither too cold nor too barren for the hardier grains and vegetables, such as rye, barley, potatoes and peas. Parts of it, too, are well wooded, but as long as there are other and more fertile portions of our Dominion to be had for the asking, and as long as the magnificent forests of British Columbia are left to us, we cannot expect that many people will choose the Yukon as a home. At present, in addition to the Indians, who live by trapping, hunting and fishing, the few white people in the Yukon are found either at the fur-trading posts or are engaged in mining.

The Peace River district, lying roughly four hundred miles northwest of Edmonton, can hardly now be said to belong to the outposts of Canada, and in the article on Alberta you will find a description of it. Here it may be said, however, that the prospects for this area are bright indeed, and as soon as railroad communication becomes better the Peace River is sure to become one of the finest agricultural areas of Canada. In this rich soil, which but a few years ago was thought to lie in a land too cold for agriculture, wheat grows with an amazing rapidity, and the product is of the finest hard grade. In summer the soil holds its moisture, while the sun shines for twenty hours out of the twenty-four. The result is that cereals with roots, vegetables and small fruits grow and ripen fast. The great disadvantage under which the district at present lies is that its access to the Pacific Ocean involves the long roundabout journey, first east and then south through Edmonton and Calgary. When more direct communication is opened up, this area will become filled with settlers.

THE NORTHWEST TERRITORIES

The Northwest Territories include all that part of the Canadian mainland which is not contained in the nine provinces or in the Yukon. They are bounded on the east by Hudson Bay, on the south by the enlarged province of Manitoba, Saskatchewan, Alberta, British Columbia, on the west by the Yukon Territory, and on the north by the Arctic Ocean. The southwestern portion of this area, particularly the valley of the Mackenzie River, is the most valuable.

In this part, splendid forests are found by the rivers almost as far north as the Arctic Ocean, and the hardier grains and vegetables can be grown nearly as far north as the trees extend. The Mackenzie River itself is a very large stream, in places extremely beautiful. The most uninteresting part of its course is near its mouth, where the ground is low and marshy and no trees grow.

Coal of poor quality is found in many places along its banks. There is a large field of petroleum and natural gas which extends one hundred miles on each side of the main waterway. In 1921 oil was discovered by the Imperial Oil Company's drillers at Fort Norman, five hundred miles north of any other well in Canada. The strike was at a depth of three hundred feet, and testing revealed high quality, but difficulties of transportation are very serious and there is no local market of any extent.

THE BARREN LANDS ARE WELL NAMED

Most of the eastern part of the Northwest Territories is well named the Barrens, or Barren Lands. They are entirely bare of trees, and in winter the only wild animals found there are the musk-ox and wolverine, and caribou in places, while the only sample of bird life is the ptarmigan, which is said to be found only where it is cold enough to freeze mercury. On their southern border these Barren Lands are bounded by stunted trees, the northern limit of which extends toward the northwest from a point on Hudson Bay near Fort Churchill to a point near the mouth of the Mackenzie River.

The trees are small and withered, like decrepit old men. An added touch of sadness and misery is given by the garments of "caribou" moss in which many of them are clothed. Farther south they are, of course, much larger and more vigorous, but the short summers and long winters of the North give them little chance to grow, so that a hundred years'

PEOPLE OF THE HUDSON BAY COUNTRY

ESKIMO GROUP ON THE GREAT WHALE RIVER

ANOTHER GROUP ON THE SHORES OF THE BAY

BOAT-BUILDERS AT FORT GEORGE, HUDSON BAY

These pictures show some of the types one may see in the little-known land around Hudson Bay. We know that their lives are full of hardship, but if they can secure food and clothing, they ask for little more. The caribou and other animals furnish the greater part of their food, and they are able to get in exchange for the furs they have taken enough of the white man's goods to satisfy their few remaining simple wants. These people have many good qualities, as visitors and explorers testify, though, of course, their ideas are not those of the white man. Whether civilization would make them happier is doubtful.

Photos, Brown Bros.

growth on the border of the Barrens is perhaps no more than ten years' in the southern parts of our country.

THE AWAKENING OF SUMMER

Following the long winter's sleep, the first warm days of summer—there is no spring—make a great change in the Barrens. Large herds of caribou which have spent the winter within the forest border start on their summer journey toward the north, where their young are born. Geese, ducks and other birds arrive from the south in immense flocks, and are soon busy feeding their little ones. Wild flowers of the hardier kinds are in bloom, and the moss which covers the Barrens starts into life.

But this lasts for only two or three short months, for in September or October Winter starts his long reign again. The icy winds sweep down from the north, storm follows storm, and the Barrens are again left to the few musk-oxen, which still roam the wilds, and the hardy ptarmigan, for whom the cold has no terrors. The first visitors to leave are the summer birds, followed soon after by the caribou on their journey to the woods which give them some protection from the harsh winter.

THE ESKIMOS AND INDIANS

At the extreme north of this inhospitable land, along the Arctic coast, the Eskimos manage to support themselves during the whole year. In the winter they live in houses built of blocks of ice or snow, unlighted and unwarmed save by seal-oil lamp or stove, which serves the purpose both of a lamp and stove. Though explorers have been glad to accept their hospitality, their manner of life seems unbearable to us, especially during the depths of winter, when for weeks at a time the sun never shows his face above the horizon.

On the other hand, at midsummer the sun never sets, so that there is constant daylight for some weeks. This, of course, is true only within the Arctic Circle, where the Eskimos live. And even winter's gloomy days are not entirely dark and dreary, for then the Northern Lights flash their gorgeous signals over King Frost's domain.

The Indians, unlike the Eskimos, spend most of the winter in the more hospitable West, but in the summer they make numerous raids into the Barrens to hunt the caribou, whose flesh forms their principal food. Even in the early winter they are sometimes forced to leave their homes for the same purpose, and to bring in the supplies of caribou meat which have been left behind during the summer's hunt.

THE LACK OF FUEL CUTS EXPLORING SHORT

The principal reason why the Barrens are a terror to the winter explorer is that there is no wood there for fuel, and so it must be carried from the border on dog-sleds. Now, wood is very bulky and only a small quantity can be taken. Therefore the winter journey into the Barrens must be a very short one. Many an Indian, after burning even his tent-poles, has in the end died miserably in this unhappy country. A few white men have made short dashes into the Barrens in winter, but their adventures have been far from pleasant.

Many have been attracted by the desire to see and hunt the musk-ox, that strange-looking beast, half sheep, half ox, the numbers of which are fast becoming less and less as the years roll by. Others have traveled across the Barrens on exploring expeditions, either sent by the Government or led by that love for the unknown which we all feel more or less. These men have generally traveled in summer as much as possible and have followed the watercourses in their canoes.

The lines of rivers and lakes which our maps of the Barrens show are the roads followed by these brave men. We know nothing about the vast area of land and water between these roads, but we can guess that it is not very different from the country which has been described by the travelers, and so we say that it is all equally barren and forbidding. There are copper-bearing rocks for five hundred miles along the Arctic coast, and at frequent intervals in the Barren Lands, Huronian rocks which might hold gold, nickel and iron ore.

Not long ago expeditions were sent by water around the Atlantic coast to the islands in the Arctic Ocean. It is pleasing to the pride of some of us to think that these islands have been taken possession of, but it is hard to see in what way they can ever be of any use. A few Eskimos are found there, but probably white men will never be content to make homes in these bleak, rocky fortresses.

HAPPY LITTLE ESKIMOS

As soon as the little Eskimo can run about he is clothed exactly like his father, in tiny imitation of his caribou coat and hood and sealskin boots.

An Eskimo mother makes no baby clothes. The naked baby lives in the fur hood of the mother's deerskin coat in contact with her body.

The first playmates of the Eskimo baby are the puppies, and the first game is harnessing them to the sled for a "mush," or journey over the ice around the igloo. The parents are tender and affectionate, and Eskimo children are never spanked or corrected harshly.

THE ESKIMOS OF THE NORTHLAND

FAR to the North, in a land where no trees grow, live the Eskimos. Their problems are the old ones—food and shelter, one as important as the other. Tents of skins which can be easily shifted to follow a herd of caribou or a school of salmon in the brief summer; snow-houses in the winter, built where there is at least a likelihood of getting food; a hunting and a traveling canoe; a team of dogs and a sled—these are all the properties of these few humans against the background of the great white North.

"The Ruler of the Team."

When the long dark winter approaches, swift on the few precious weeks of summer, the Eskimo makes no delay. With his big snow-knife he cuts out blocks of snow, sets them in a true circle, and adds others till he has a dome-like building, or *igloo*. His snow-blocks freeze together in a few hours, and his roof will bear the weight of several persons.

Inside, his snow-house is heated and lighted by a primitive seal- or whale-oil lamp furnished with a wick of dried moss. The scanty heat is sufficient, for the walls must be kept dry for the human occupants and for their furs. If the temperature rises above the freezing-point and the ice-blocks begin to thaw, the Eskimo woman makes a hole in the side till it cools off, and then fills up the gap with soft snow which soon freezes.

Furniture in an igloo is little more than cooking utensils. A wandering life keeps possessions low. It entails summer as well as winter traveling, when human backs must bear their own load, for the "huskies," though they will tirelessly drag a sledge in winter, are poor pack dogs for summer travel. The necessary hunting and fishing equipment, the essential clothes and utensils—these are all the Eskimo looks for. To the home-made walrus-hide containers and massive stone pots of the old igloo have now succeeded the light strong pots of the trader.

Winter days in the igloo are somewhat lightened by the children and by a friendly brood of puppies, offspring of the carefully bred Malamute dogs, the prized possession of the Eskimos. A husky has only one winter inside, for as he grows up he devours everything within reach.

These dogs are valuable: a good sledge dog costs from $60 to $100, so that a well-matched team represents a considerable investment of money. Dogs are exchanged for a rifle or a fine bundle of skins.

The sledge dog is a willing worker; he may howl and snarl while he is drawing his heavy load, but he will not rest until exhausted. As a rule the Eskimos are kind to their dogs, though they punish fighting and laziness severely. Every team has its leader, a wise experienced dog, strong enough to enforce his authority in the constant fights.

In the Far North dogs are harnessed fanwise. This gives greater control to the driver, but as the traces become entangled, they have to be cleared every few hours. Farther to the south below the timber-line, where trails are narrow, sledge dogs are harnessed in single file, usually four to a team. The sledges must be very snugly packed, as they are apt to be turned over by a boulder or ice-cake.

With the lengthening of the days the family prepares to move. The *omiak*, the large skin traveling canoe, is loaded and journeys toward the salmon grounds. After salmon comes "Mimeek," the eggs of wild fowl, then wild berries—huckleberries and cranberries—all a great treat to people who have subsisted all winter

Spearing a walrus from the edge of an ice-floe. A good hunter can hurl his weapon forty feet and with force enough to kill a 2,000-pound walrus.

Often the salmon fishing comes in time to save whole families from starvation. Lying on the ice, the Eskimo fisherman attracts the fish with two ivory jiggers. When the fish rushes to this it is killed with the three-pronged spear.

Photos from Nanook of the North by Revillon Frères, courtesy Pathé Exchange.

on the fat meat of seal and walrus or on dried fish.

Every Eskimo is a hunter by profession. He hunts the walrus and seal in the sea, and the bear, caribou and smaller animals on land. From his *kyak,* or balanced upon an ice-floe, he makes his attack upon a walrus—the most coveted food animal of the North. At lightning speed his strong spear hurtles through the air and strikes the vulnerable point

Water bucket and dipper of walrus hide sewed with waterproof stitch.

of the wallowing beast. It is beyond the Eskimo's strength to drag the huge carcass ashore, but he can at least anchor it until friends and neighbors flock eagerly to his help—and to the feast. The latter takes place immediately, for the Eskimos fall upon newly killed game, tear it apart with their hands and consume it raw while it is still warm.

The hide is carefully treated and used to make dog-harness and house utensils, the tusks reserved for sledge-runners and spearheads.

Hunting the various kinds of hair-seals found near Hudson Bay is an occupation that requires a great deal of patience. As the seal is a mammal, it has to come up to breathe about every twenty minutes and it uses blow-holes in the ice. Over this hole, with his spear poised, crouches the hungry hunter, often only to be disappointed of his prey as the wary seal appears through another hole. If, however, his patient watch—sometimes lengthened into days in times of scarcity—is rewarded, he dispatches the seal with a quick thrust of his spear.

Seal-meat is good food, seal-oil feeds the igloo lamp, and sealskin furnishes the beautiful boots worn by all the family, even the little children.

The winter caribou is also hunted, not so much for its flesh, which is destitute of the fat necessary to a northern diet, as for its skin, which, warm and soft, makes good trousers and *parkas,* or hoods.

The spring salmon fishing, coming at the end of the long winter with its dangerously diminished store of food, is looked upon as an outing by the whole family. The Eskimo salmon spear is a staff with three prongs and a seal thong which is used to retrieve the weapon after a throw. Instead of bait the fisherman uses ivory jiggers to attract the fish, poking these down through a cleft in the ice. When the salmon swims up, he strikes sharply with the spear.

Eskimo women are very necessary in the life of the community. They are splendid mothers and good housewives, but indifferent cooks in a country where food is often eaten raw. In addition, they are the tailors, boot-makers and hatters of their family. They prepare for use the skins of the animals which their husbands have killed, and then make up the fur wardrobes with which every individual, except the babies, who wear no clothes, faces the extreme cold.

Perhaps the greatest of their achievements are the well-fashioned sealskin boots worn by all the family, and the coverings for the canoes. The Eskimo uses a large canoe, or *omiak,* for traveling, and a small canoe, or *kyak,* for hunting. Over the framework of driftwood pieced out by bones of animals, the Eskimo woman laces a sealskin cover, finishing with a deck of skin which leaves a circular opening for the paddler. Upon her care and skill in this work depends her husband's life.

The Festive Board—From the painting by Jan Brueghel.

MEAT AS A FOOD

CONTINUED FROM 2425

NEARLY all of us eat meat and like it, yet there have arisen many questions concerning meat which all good people should consider. In the first place, let us consider the most important of all the arguments—whether it is right to take life for the purposes of food.

Some religions have taught that it is wrong. There are parts of the world where a man will move the tiniest worm or insect out of the path lest someone should tread on it, and where it is regarded as wrong to take life of any kind, even the life of a poisonous serpent. Perhaps the truer idea is that it is wrong to take life for pleasure, but that it may be quite right to take lower forms of life in order to serve higher forms of life. Perhaps it is wrong to kill a serpent for fun, but it is certainly right to kill a serpent to save a child.

Now, when we eat meat, of course it means that an animal has been killed. This is true also when we eat an egg, for an egg is a very young animal. But no one really objects to the eating of eggs, because we know that when we kill the egg, which we do when we cook it, we inflict no cruelty. That, surely, is the real question for us.

In the case of the sheep or the ox, then, we remember that in any case the animal must die some time, for all living creatures are mortal. If we kill it without pain and instantly, that is far more merciful than to allow the animal to die of disease or old age, and more merciful than Death is in his dealings with mankind. We may say, too, that while the animal was alive it enjoyed its life, and that, though we brought the animal into existence for our own purposes, it owes to us the happiness it had during its life, even though that life was short.

This means that the highest question regarding the eating of meat is the question as to how the animals are killed. Whenever there is reason to suppose that animals are killed less quickly than need be, and with some cruelty, we should protest, and say that we will not eat meat unless we know that the slaughter-houses are as good as they can be. But if these conditions are complied with, surely we may say that, so far from our practice of eating meat being cruel, it really means conferring the pleasure of life on a great many creatures which would otherwise not have come into existence at all. The only price which they have to pay is the price all creatures pay for life, and that the smallest possible—death painless and unfeared. So now, if we always remember this question about the killing of the ani-

mals, we may regard the moral question as satisfactorily settled, and may go on to study the good and bad results of meat-eating as a question in the science of the body.

There are other arguments which people use about eating meat. Some people say that the races eating the most meat are the leading races of the world. They want us to believe it is meat that makes them the leading races. Others say that the races eating the most meat are the brutal, war-like oppressors of the world, and want us to believe it is the meat that makes them brutal. Now the question is, Are the facts as they are stated, and would they mean what they are supposed to mean if they were really the facts?

Almost the most important truth about man is his amazing power of adaptation. The vegetarians in our own country have shown us that without the use of meat it is possible to make athletic records, and to turn out splendid and vigorous works of the mind. They have proved that, and we have to recognize the fact, whether we like it or not.

SOME PEOPLE SHOULD EAT MEAT AND SOME SHOULD NOT

It used to be said that if we did not eat meat we should become weaklings, soft in body and mind. This is not true, and we have to admit that it is as possible to be strong, in both body and mind, without meat as with it.

On the other hand, nobody has yet begun to prove that we should necessarily become stronger, in either body or mind, if we ate no meat. The truth probably is that the great majority of people can adapt themselves equally well to either kind of diet if they go about it wisely. Also, there are people who are so made that it is much better for them to eat meat, while others are better without meat.

A study of meat itself does not help us very much. It is certain that the *color* of meat proves nothing as to its use. Nothing makes such red blood as white milk. The only important point about the color of meat is that white meat, like chicken, is more easily digested than butcher's meat. This is true also of the many kinds of fish. The meat we eat is made of muscle-fibres, and muscle-fibres vary very much in size and length. The smaller and finer they are, the more easily they are digested; but all white muscles are not easily digested, for the muscle-fibres of such a creature as the lobster are very tough and difficult to digest.

We learn, then, that the color of muscle food proves nothing as to its value. There is some meaning, however, in the *taste* of it. When a food is pleasant to the taste we know that it is especially likely to call forth the digestive juices, and that is a real value.

THE GREAT VALUE OF MEAT SOUP TO SOME PEOPLE

It has also been proved that, even apart from taste, the flavoring substances in meat are more powerful in calling forth the juices of the stomach than any other food. Careful experiments have been made by a great Russian observer. Of all the substances tried, none calls forth the juices of the stomach either in such quantity or in such strength as meat does. From this it follows, in the case of people whose appetite really needs to be helped, that it is sensible to begin a meal with a little clear meat soup. Clear meat soup contains little or no food matter, for the food part of meat is tasteless and solid; but it does contain the substances which help the stomach to do its work. It is interesting to know that vegetarian animals, which do not get enough salt in their food, sometimes rush wildly for miles to places where salt can be obtained. Every creature must have salt in its blood. Now, muscle is rich in salt, and so this fact also may be used as an argument in favor of meat.

THINGS WE LIKE AND THINGS THAT ARE GOOD FOR US

It is very important that we should know how far meat is useful for children. First, children, like all other living things, differ from one another. One child will like meat and another will dislike it. So far as these likings and dislikings are natural, they should very largely be trusted. If the child is in health, its body, of which the appetite is the voice, probably knows what is good for it better than other people are likely to guess. But we ought to be sure that we are dealing with natural appetite and not with something that has been made by the special way in which the child has been fed. Many children, if they are regularly offered highly flavored dishes—gravies, beef extract, soups, and so on—will soon get to like meat very much.

They will probably be inclined to take much less than they should of simple foods which are really safer and better for them. Nevertheless, the food Nature provides for the child when it is very small has practically no flavor at all, and neither the mouth nor the stomach of a healthy child needs highly flavored food.

When a child does not care for meat nothing could be more foolish than to force meat upon it. Probably the less meat a child has, the better; and nothing is more certain than that if a child is properly fed in other ways, especially with abundance of milk, it will suffer no loss of strength or vitality from the lack of meat.

It is true that the flavoring substances of meat are of the nature of stimulants, not only to the digestion, but also to the brain. They make us aware of our strength. No doubt this often gives a real value to meat in the case of grown-up people, but there is a time to stimulate and a time not to stimulate. Something is wrong when a child needs a stimulant.

THE FOOD OF WHICH WE EAT MORE THAN IS GOOD FOR US

The natural, healthy child is a perpetual-motion machine, except when it is asleep, and its splendid activity puts most of its elders to shame. Grown-ups may perhaps want stimulants to make them like children, but the problem of the child is rather to prevent it from getting too much excited, and to persuade it to go quietly to bed. Children are likely to become excitable, and then, of course, they have to pay the price for being overexcited. They do not sleep deeply enough; perhaps they have dreams; perhaps they wake up suddenly, terribly frightened. In many cases it will be found that if we have the wisdom to stop giving the child the stimulants, such as meat and tea, which it does not need and which are only bad for it, we shall cure these troubles.

We need not fear that the child will suffer. There is no lack of strength or vitality about the gorilla or the elephant or the horse, and these get their strength without eating muscle. The biggest and strongest flesh-eater among men is no match for any of these so far as physical strength is concerned.

It now seems certain that even grown-up people eat far more meat than they need and far more than is good for them. As meat is a highly expensive food, this is, of course, a waste of money; but the stimulating substances in meat are capable of injuring the body if they are taken too freely, and that is more serious than injuring the purse.

Fish, of course, is a form of meat. It is a very good food, and some fish are cheap—unless we choose to pay for flavor. There is no truth in the notion that fish has a special value for the health of the brain. Fish does not contain more phosphorus than other kinds of meat.

THE GREAT VALUE OF EGGS AS A FOOD FOR MAN

Eggs are excellent food. We know what the hen's egg becomes, and everything that makes up the body of the living chicken must have been in the egg, except for a certain amount of oxygen, which was breathed in through the egg-shell. White of egg very largely consists of water; indeed, only little more than one-tenth part of it really consists of albumen.

The yolk of egg is by far the most nourishing part, and nearly one-third of it consists of fat in a really digestible form. The yolk is also particularly rich in phosphorus, lime and iron which can be easily absorbed, and is therefore a specially good food for people whose blood is poor and for rickety children. No food except milk contains so much lime as the yolk of egg does.

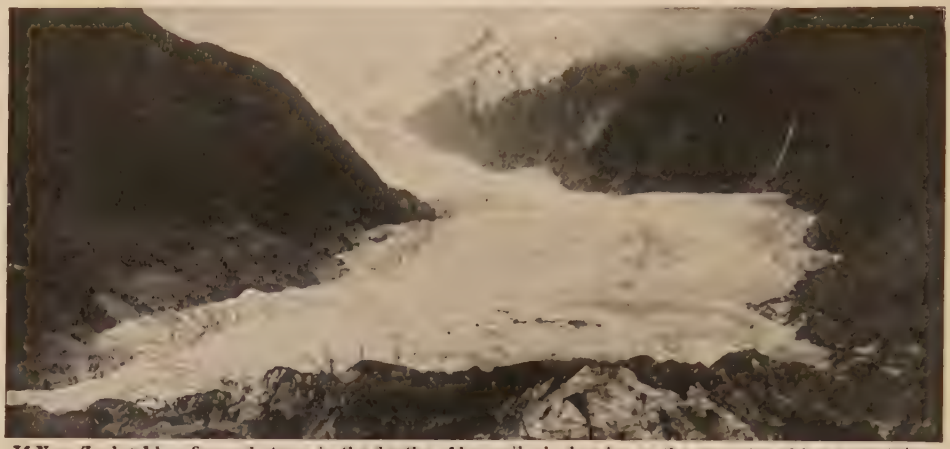
The less an egg is cooked, the more easily it is digested. A hard-boiled egg stays in the stomach more than three hours—about twice as long as a soft-boiled egg. Practically the entire food substance in eggs is absorbed by the body—a great contrast to many other foods, much of whose food substance never gets into the blood.

THE BEST KINDS OF FOOD FOR BOYS AND GIRLS

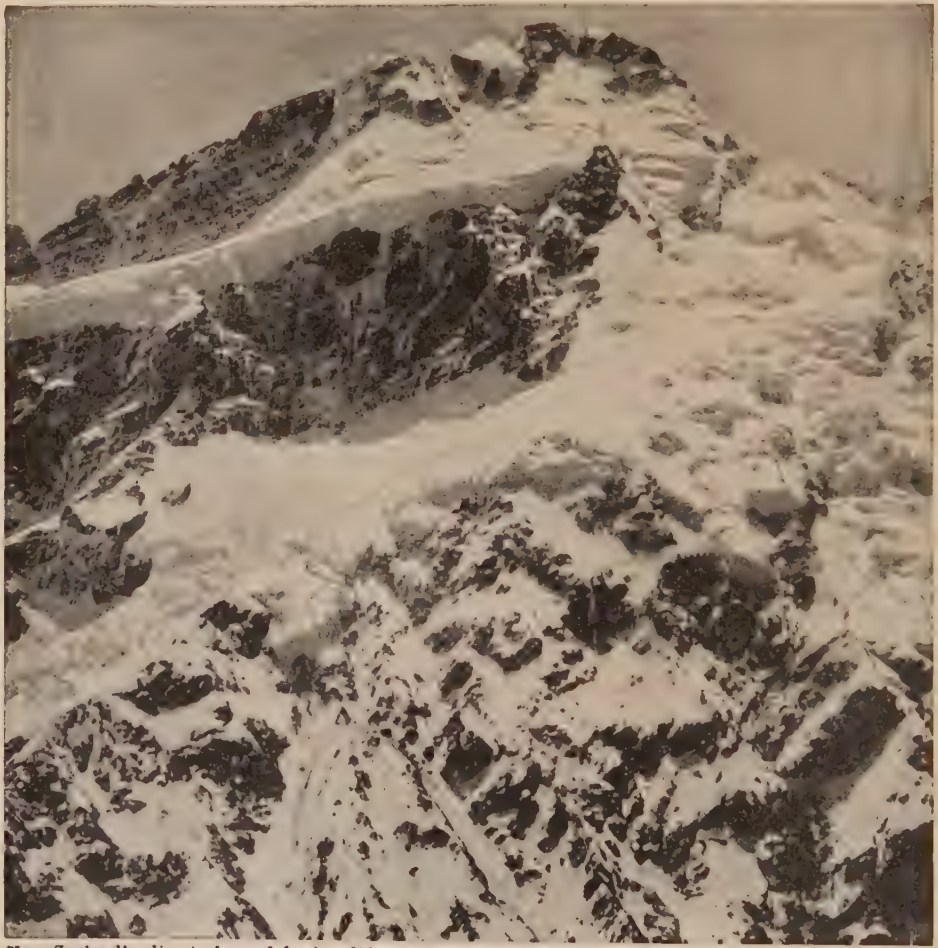
Like milk, eggs are to be highly recommended for children of all ages, and one may begin giving a little of the yolk of egg to a child after the first year of life. The best sources of protein for children of all ages are: milk, first and foremost; then oats and wheat, eggs, fish, chicken; and at the bottom of the list, a little lightly cooked meat. Milk and its products and the yolk of egg are also the best sources of fat that can be found.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 2681.

MOUNTAINS OF SNOW AND RIVERS OF ICE



If New Zealand has fire and steam in the depths of her soil, she has ice on the summits of her mountains. From the Francis Joseph glacier great volumes of water carry life and fertility to the plains and valleys.



New Zealand's climate is good for invalids. There are many mountains to climb, and here we see Mount Sefton, in that part of New Zealand called Mackenzie. It crowns with rugged glory a scene of perfect beauty.

NEW ZEALAND, THE BEAUTIFUL DOMINION

CONTINUED FROM 2473

WHEN Captain Cook sailed away in his little ship, the Endeavour, by order of George III, in 1768, to make discoveries for England in the Southern Seas, he rounded Cape Horn, and found his way to some islands in the midst of the great Pacific Ocean. They are called the Society Islands now, and belong to France. They are so beautiful that they are often called an earthly paradise. If we could but see with our eyes what those dots in the map of the Pacific stand for!

Islands are always pretty, even in a park lake, or off a broken shore. But in this far-away blue ocean, under the golden sunshine, in the clear, balmy air, it is like fairyland, whichever way we look. If we look down into the crystal water, there are the bright-colored sea creatures darting about, and splendid shells lying on the dazzling white beaches. Some of the islands are so low that they are scarcely raised above the water; on these grow feathery-topped palm trees, tall ferns, and brilliant flowers and shrubs, through which one can see peeps of the pale green water of the lake-harbors hidden inside the ring-shaped island. On the higher, larger islands—none larger than New Jersey—grow sugar-canes, tobacco, fruits, and beautiful trees clothe the hillsides.

The brown-skinned children of those islands enjoy bathing in the delicious warm sea. They can swim before they can run and they dive fearlessly through the rolling waves, playing the prettiest water games as nimbly as if they were seals or dolphins. In Captain Cook's time the tribes of people who lived in the various islands were very fierce and warlike; but since his day many missionaries have gone out to teach them to be more gentle and to give up their old wild ways and their cruel religion.

Delightful as these islands were—and there are so many that Captain Cook found "discovering" quite bewildering work—the little ship Endeavour had to go on and find her way to the land named a hundred years before by the Dutch sailor Tasman, New Zealand.

Several centuries before that a brown-skinned, wavy-haired sailor chief had run his long canoe aground and beheld with delight the white cliffs and trees of the North Island. *"Ao-tea-roa!"* he exclaimed, meaning the "Long Bright World," as he and his bold seamen leaped ashore. They had been driven from their homes in far-distant islands of the Pacific by stress of war, and to this day, though far away, the

dwellers in the eastern islands of Polynesia and the Maori people found by Europeans settled in New Zealand still have in common the same old legends and customs, and speak much the same language. Captain Cook spent six months on his survey of the "Long Bright World." He discovered that there are two large islands, parted by the straits now called after him, and a smaller one to the south —the North, South and Stewart Islands.

WHERE WE SHOULD COME OUT IF WE COULD FALL THROUGH THE EARTH

Altogether the islands are nearly the size of the United Kingdom, and if we can imagine a line driven straight through the earth, it would come out the other side near the islands of New Zealand. If you look on the map you can see the more exact spot marked as Antipodes Islands, where the feet of people walking—if there were any people there—would be just opposite those in England, though 7,000 miles apart.

Captain Cook describes in his journal how handsome and fine-looking were the Maoris; how curiously they tattooed their faces in patterns; how they wore feather cloaks and green-stone ornaments. He mentions, too, their warlike disposition, though on the whole he seems to have got on very well with them, and they promised when he went away not to disturb the two posts he had set up to carry the Union Jack.

In the Natural History Museum, New York, are cases full of the works of the Maoris, as the descendants of the bold Polynesian explorers call themselves, and very beautiful and clever are the carvings and polished tools.

HOW WE CAN HAVE TWO SUMMERS IN ONE YEAR BY GOING TO NEW ZEALAND

But the Endeavour had once more to go on her way. Leaving Cape Farewell, as they named it, on the north point of the South Island, and sailing away over a thousand miles to the northwest, the explorers arrived at length on the east coast of New Holland, now Australia, where they found a very different race of natives, the Blacks, perhaps the lowest in the scale of human beings.

For some years after this exploration of Captain Cook the Maoris remained undisturbed but for the visits of whalers and traders and adventurers. On Christmas Day, 1814, we find them listening, on a beautiful bay in the North Island, to their first sermon from a Christian missionary—Samuel Marsden. A lovely summer open-air festival is Christmas in New Zealand, with abundance of flowers and sunshine, for the seasons there are exactly opposed to ours in the northern hemisphere, and if we leave Vancouver in the delicious spring days, we arrive twenty-one days later in time for golden autumn in New Zealand. Or if we want two summers in a year, we can leave home after our own, and, going even late in our autumn, can still be in time to enjoy another just beginning this other side of the world.

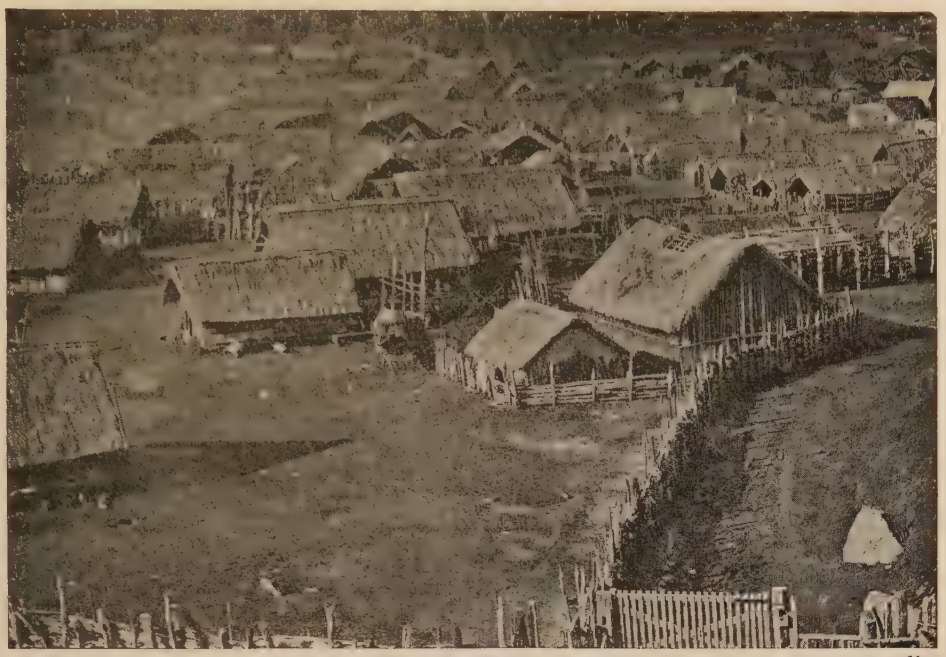
About thirty years after Marsden came settlements began in earnest. Soon after Queen Victoria came to the throne New Zealand was proclaimed part of the British dominions. A great Scotch settlement soon followed, on the east side of the South Island, and round Dunedin (the old name for Edinburgh) most of the names came from Scotland. It is said that the children even now speak with a Scotch accent in this land settled by their grandparents.

THE OLD BATTLEFIELDS HIDDEN UNDER FIELDS OF GOLDEN CORN

An English church settlement was made to the north of Dunedin, in the Canterbury plains, with its capital, Christchurch, and visitors from England say that nowhere in this colony does it seem so homelike and so English as among these grassy hills and well-watered valleys.

There were, unhappily, wars lasting many years with the Maoris, chiefly connected with the possession and selling of the land. British gun-boats were seen on the peaceful creeks, the sound of the bugle echoed over the valleys, and red coats showed up against the green hills. Battlefields to-day lie hidden under fields of grain, for all has been peacefully arranged, and the brave and skillful Maoris have settled down to the civilization of the strangers. They own land which they farm or let; they have flocks and herds, and some of them are educated and hold important positions in the country. They have an ardent love of their own land, and, indeed, they well may have, for it is one of the most beautiful and fertile in the world. This love is shared, too, by the people who have made their homes there, and they are proud to hold together as a nation of New Zealanders.

The climate is partly the reason for



Here is a picture of a Maoris settlement. The Maoris, or aborigines of New Zealand, are a peculiar people, and at one time were very savage, cutting off and pickling the heads of their enemies, and eating their bodies. That time is long past and the Maoris, who are very intelligent, have made great strides toward civilization. Four members of the House of Representatives must be Maoris, elected by their own people.

New Zealand has many miles of forest lands and wooded mountains, which contain valuable trees, and large quantities of lumber are exported each year. Unfortunately small provision has been made for reforesting, and unless measures are quickly taken the islands will soon feel the want of trees. Here we see a saw-mill tucked away at the foot of a beautiful hill.

Photos, Brown Bros.

this; it is so healthy and enjoyable, with no fogs or depressing damp, but with plenty of wind and sunshine, and so the people are strong and capable of working hard and making the most of nature's gifts.

THE HIGH VOLCANIC PEAKS OF THE MOUNTAINS OF NORTH ISLAND

New Zealand consists of two main islands stretching from north to south for 1,000 miles. It therefore has a considerable variety of climate, increasing, of course, in cold toward the southward. But it also is mountainous throughout, and so has the changes of climate due to altitude. The North Island is warm and mild, and in the neighborhood of Auckland becomes almost subtropical.

Southward of the peninsula on which Auckland, the most populous city, stands, North Island expands into a shape roughly square, having as its centre a lake, Taupo, 238 square miles in extent. Taupo is situated on a plateau, crossed from south to north by several ranges of mountains rising to nearly 6,000 feet, but overtopped by loftier volcanic peaks of which the highest, Ruapehu, reaches 9,100 feet. This is the topmost summit of North Island.

Mount Egmont, 8,340 feet, at the southwest corner of the square, is, however, the finest mountain—a graceful cone-shaped peak, forest-clad and snow-crowned, and visible a hundred miles away at sea.

Round Lake Taupo, and to the north of it, is the most characteristic feature of New Zealand, a region of hot springs very popular for bathing purposes, the chief resort being Rotorua, where there is a government sanatorium.

THE WONDERFUL REGION OF BOILING SPRINGS AND STEAMING HOLES

Here, and at many other places on the lake-strewn plateau, boiling springs bubble up into pools through the heated ground. Sometimes they burst out with such force that they rise like a great fountain over a hundred feet high. In other places there are clouds of steam rising from smaller jets. In this district many of the Maoris live. The women have no need to light fires, for their food cooks in the steaming holes. In pools that are only pleasantly warm people can bathe all the time. Invalids come for their ailments to be cured by the hot springs, and tourists to see the strangeness of the scene and the beauty of the landscape.

The drawback to this New Zealand paradise is that some of the volcanoes are always in an active state, and earthquake shocks are by no means infrequent.

Passing the stormy Cook Strait, which separates the North and South Islands by 16 miles in its narrowest part, we leave the region of subtropical storms and rain, and come to a land of generally westerly winds like England. Wellington, the capital of New Zealand, is on the North Island side of Cook Strait, and it is said to be the windiest town in the world outside of Tibet. New Zealand people say they can always tell a man who comes from Wellington. He invariably raises his hand to hold his hat as he turns the corner of a street. It is so much a habit that he does it even in other countries.

South Island, oblong in shape, has as its principal physical feature a range of mountains running from north to south, nearer its western than its eastern coast. Only at one point can anyone cross from the east to the west coast without crossing a pass 3,000 feet above the sea. This great range is called the Southern Alps, and it deserves the name, for its highest summit, Mount Cook, rises to 12,349 feet, is crowned with perpetual snow, and sends down enormous glaciers, one of which, named after Tasman, the Dutch explorer, is 18 miles long.

THE FINE CLIMATE OF THE HEALTHIEST COUNTRY IN THE WORLD

Farther southward there are fine lakes and wild and grand scenery, and on the coasts of the island deep fiords run through rocky walled sides far into the land.

New Zealand, indeed, is a land of great beauty, with many suggestions of tropical luxuriance in the north and of Alpine and Norwegian grandeur in the south. It has, too, the splendid advantage of being the healthiest country in the world. Set in the midst of a wide stretch of ocean, though it has strong winds and stormy seas, its climate is temperate, and it has not the strain of sudden changes from heat to cold. It has, too, the advantage of regular rain with scarcely any periods of drought.

The city of Wellington is the capital of New Zealand, and has its harbor, the busiest harbor in the dominion, on Cook's Strait. It has fine public buildings, in one of which the New Zealand Parliament sits for six months of the year. Women

MAP OF THE ISLAND DOMINION

New Zealand has some striking resemblances to Britain, and has been called the Britain of the South Seas. Divided, like Britain, into two main islands, it has a climate very much like that of the south of England. The country, which is shaped like an inverted Wellington boot with a break just above the instep, is nearly 1,200 miles long and covers 104,471 square miles. It is about a thousand miles from Australia.

as well as men, Maoris as well as others, have a vote in choosing their members of Parliament; there are four Maori members. It may well be said of New Zealand that the great body of the people control the affairs of the nation. They already have their old-age pensions; their railways, telegraph and telephone lines are owned and worked by the state for the improvement and good of the country, not for private profit.

When the World War broke out in Europe in 1914, New Zealand felt that it was concerned, both as a part of the British Empire and as a self-governing state, and sent many brave soldiers, who fought valiantly on many battlefields.

AVALANCHES THAT FALL LIKE THUNDER AND MILES OF GLITTERING MOUNTAINS

There are five provinces in South Island —Nelson and Marlborough on the north, Westland and Canterbury in the middle, Otago on the south. Between Westland and Canterbury runs, as we noticed before, the beautiful range of the Southern Alps, over 300 miles long, and here we feel as if we were in a Switzerland as beautiful as the one we know and love so well in Europe. The highest mountain, Mount Cook, which the Maoris called "Aorangi," which means "the Light of Heaven," is nearly the height of Mont Blanc. The great ice-rivers, or glaciers, are among the most magnificent in the world. From them great avalanches constantly fall with thundering noise, and miles of glittering white peaks against the blue sky contrast in flower-time with the dazzling colors of the beautiful carpet of flowers on the lower mountain slopes.

On the east side of the range lies the great Canterbury plain, one of the richest districts in the country. Here grain stores are found at the stations on the railway line, like the elevators in Manitoba, for great quantities of wheat and oats are grown.

THE SPLENDID FARMS THAT SEND WOOL, MEAT AND GRAIN ACROSS THE SEAS

Besides this, there are splendid farms for dairy produce, and thousands and thousands of sheep flourish, giving great quantities of valuable wool, and providing, since the introduction of cold storage, the Canterbury mutton and lamb, which helps to feed so many of the people on the other side of the world. Christchurch, the capital of this province, is a beautiful garden city of broad streets and open spaces. In Otago are the famous lakes and fiords, and from this province are also sent away large quantities of wool, meat and grain. Dunedin, a handsome city with many churches, is the capital of Otago province. Little more than thirty years ago the first cargo of frozen meat was dispatched from this colony, and this trade has grown enormously between that time and our own day.

In Southland and Stewart Island, called the "last and loneliest," from its position beyond South Island, is also much grand and beautiful scenery. More ice-capped peaks, large glaciers, and great granite precipices, 5,000 feet high, are found at Milford Sound, and there are falls, one of the wonders of the world, nearly 2,000 feet high, like a silver ribbon hanging over the rough mountain wall. Here and there are dark, woody valleys, and deep-sea creeks running far inland, with palm trees and ferns waving over sandy beaches.

WHERE MEN GO DOWN INTO THE EARTH FOR COAL AND GOLD

This beautiful country is first of all a pastoral and grazing land. Its wealth comes from its sheep and its cattle. Butter, cheese and preserved milk, frozen meat, wool, skins, hides, pelts and tallow, timber and gum, gold and coal are its products.

A great deal of gold is found in New Zealand, both in the Auckland province and in the river-beds of Otago and Westland. The chief coal-mines are on the west of South Island and in the Auckland province. As the years come there are many more valuable minerals to be worked in New Zealand, chief among them being iron. The green stone found on the west coast of South Island was very much prized by the old Maoris, and the curious weapons and ornaments they made of it are still seen in the museums of the large towns.

As in Canada, there is great value in the water-power stored in the rivers and waterfalls of the country; and it is thought that manufactures will increase rapidly in New Zealand, such as that of making up woolens, owing to the cheap production of electricity, as happened in America last century through the use of coal in making steam.

Besides Stewart and Chatham Islands, near to the New Zealand mainlands, the dominion governs the Cook Islands, of which Rarotonga is the largest; with

ON THE FOOTHILLS OF THE GREAT RANGES

Except in the severest weather in the South Island cattle and sheep can remain in the open all year, but a cool spot is always welcome in summer. Originally the hills were covered with Bush, or primeval forest; on most farms the hills have now been cleared, but it is common to find a little shade spot untouched here and there for the animals. Here during the hottest period of the day they take refuge.

Often the Bush is preserved on the sides of a gully. Prompt action must be taken in flood times to prevent serious losses among the cattle sheltering there, for the shallow creeks become deep and dangerous.

Most of the sheep-farming is done on the foothills of the great mountain ranges. A flock wanders at will over the hills till shearing time, when mustering begins. Often a flock numbers several thousand.

3,500 inhabitants, the population of the whole group being about 13,000. Part of the Samoan group of islands, with 35,000 people, is territory intrusted to New Zealand under the League of Nations. The rest of the group is intrusted to the United States.

But we have not yet seen all that goes to make up the possessions of Britain in the southern hemisphere, called Australasia, though Australia and New Zealand are far the most important parts of it.

THE GREAT BARRIER REEF THAT RUNS ALONG THE AUSTRALIAN COAST

When Captain Cook sailed away from Botany Bay and the lovely flowers that so delighted his naturalist friend, the little ship Endeavour made her way safely for over a thousand miles northward along the coast, known for many years afterward as New South Wales. Suddenly she struck on a hidden, sharp rock, and made a great hole in her side. It was hastily patched up with sailcloth and tow, and the voyage was continued to a point now called Cookstown, in Queensland.

This was the manner of the discovery of the Great Barrier Reef, which runs along the east coast of Australia, ten to fifteen miles from the shore, acting as a natural breakwater for the harbors of that coast, and making a still and safe passage for shipping when the breakers of a not very peaceful Pacific dash in clouds of white foam upon the line of jagged rocks, now just below, now just above, the level of the sea.

How little could Captain Cook foresee the never-ending lines of ships laden with wool and gold and food that were to steam northward in the years to come, to pass through the Torres Straits on their way to Great Britain!

North of the Torres Straits lies the large island of New Guinea. It is divided between Holland and Great Britain. Great Britain's piece is much larger than Great Britain itself. There are many missionaries there teaching and civilizing the natives. The climate is very hot, and in it grow best such products as tobacco, rice, sugar, tea and coffee. There are valuable trees, too, among them the coconut, the sago palm, sandalwood and ebony. There are pearl fisheries on the coasts, as on the warm shores of Australia and the Pacific Islands.

Germany lost her possessions in the Western Pacific after the World War. Under the name of German New Guinea were formerly included: Kaiser Wilhelm's Land, Bismarck Archipelago, the German Solomon Islands, Nauru, the Caroline Islands, the Marshall Islands and the Marianne Islands. By the peace treaty all those north of the Equator were given to Japan to rule, and those south of the Equator were assigned to Australia, except Samoa, which was given to New Zealand. The Territory of Western Samoa has 1,200 square miles.

THE TWO GREAT CURVES OF ISLANDS RISING FROM THE FLOOR OF THE OCEAN

If we could drain away the water from the ocean as we can from a pond, we should see that the floor of the Pacific, the deepest and largest ocean in the world, rises to the east of Australia in two great curves. New Guinea and Norfolk Island are on the curve nearest the island continent. There is a school in Norfolk Island, to which children from other islands come.

On the outer curve are the Fiji Islands. The native chiefs and people here put themselves under British rule some years ago. Missionaries have taught them, and trade is increasing.

Most tropical plants grow well in Fiji, such as sugar, fruits and coconuts; and still farther beyond lie great groups of islands known as the islands of Polynesia, Melanesia and Micronesia. These islands, with Australia, New Zealand and the rest, make up Australasia.

HOW FAR-AWAY ISLANDS ARE LINKED BY CABLES AND STEAMSHIPS

Fifty years ago the journey to the Fiji Islands was indeed a long and trying one. First it took months to get to Australia, and then weeks in another and smaller ship to the islands. Now all Australasia and Oceania, as the groups of islands are called, is drawn near together and to the rest of the world by electric cables and swift steamships. From the north of Auckland a cable runs to Norfolk Island, Fiji and Fanning Island, to Vancouver and British North America, across the Pacific. There is also a line from New Zealand to Sydney. One travels from Auckland to England in a month, changing ships at Sydney or Fiji, then to Vancouver, and by the Canadian Pacific Railroad to the Atlantic Ocean. Steamers to London by way of Suez take six weeks.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 2695.

WAIRUA FALLS AND TIKITERE'S MUD VOLCANOES

The timber exported from New Zealand is mainly from Auckland and is largely logs from the resinous kauri, one of the giant trees of the Bush. Floods which so often bring disaster to the farmer are eagerly looked forward to by the sawmillers, for they whirl the lazy timber down the swollen rivers seaward. This picture shows us logs being swept over the Wairua Falls on their way to Kaipara harbor, thence overseas.

Not far from Rotorua is Tikitere, the centre of the boiling mud. "Inferno" and "Hell's Gate" are near at hand and the names are not more suggestive than the places themselves. The atmosphere is thick with sulphur which hangs low over the craters. "Plop! Plop!" is heard on all sides, and as the air clears for a second grotesque forms resembling frogs are visible as they are hurled into space from a basin of deep mud. At one's feet numerous "porridge-pots" spurt mud through small holes. A misstep would be bad.

Photos, courtesy of New Zealand Government, Messrs. G. Crombie, W. Reid, Valentine.

SCENES IN NEW ZEALAND'S LARGE CITIES

Rotorua in the centre of the district of Hot Springs.

George Street, Dunedin.

Cashel Street, Christchurch.

Queen Street, Auckland.

Dunedin, capital of Otago.

By the river Avon at Christchurch.

Wellington, capital of New Zealand.

TWO ASPECTS OF THE ISLAND DOMINION

A wool shed and sheep range in New Zealand. Probably no other country of similar area equals New Zealand in the extent of its sheep-grazing interests. In recent years dairying also has rapidly developed, and there is a large production of butter and cheese.

Looking up Milford Sound from Windbound Point, New Zealand. The lofty and rugged mountain range known as the Southern Alps which runs along the west coast of South Island rivals the European Alps in its wild mountain scenery.

Photos, Wide World.

THE CAPTURE OF KING LOUIS OF FRANCE

Louis IX, one of the noblest French kings, led a large army to the Holy Land. They fought valiantly, but were overwhelmed, and Louis himself was captured by the Saracens. This picture, painted on the walls of the Pantheon in Paris, shows the king a prisoner. He was ransomed only by the payment of thousands of dollars. After his return to France he started on another Crusade, but died before reaching the Holy Land.

WHAT THIS STORY TELLS US

THIS is the story of some of the men who, 800 years ago, "took the Cross," as the saying was, to fight against the Saracens in the Holy Land. They were called Crusaders, partly because they wore the Cross on their garments as a sign of their faith and of the vow which they had taken, and partly because they were going to fight for the Cross against the Crescent, which was the badge of the Mohammedans. They left their homes, having taken a vow to strike a blow to win back from the Turks the Holy Sepulchre, where the body of the Savior had lain. And many men deemed it the part of all true knights to take the Cross, and counted a death with sword in hand against the infidel the best that a man could die. Now, when we see in some old church a tomb bearing the effigy of a knight in armor, lying with his legs crossed, we may know that he was one who went on Crusade, because the crossing of the feet was taken as the sign of a Crusader.

THE MEN OF THE CRUSADES

CONTINUED FROM 2500

IN the ancient days men were wont to go on pilgrimages; that is to say, they would take long journeys in order to visit the holy places of the world. By the holy places we mean the spots where holy men had lived or had met with a martyr's death, or where they had been buried. For this custom there were many reasons.

First, when we go to such places it helps us to think of the saints and martyrs, and to strive to live lives like theirs. But besides, in those days everyone believed that it was right to pray to the saints and martyrs to intercede for them before the throne of God; and they fancied that the saints would listen more readily to prayers that were offered in the places that had been dedicated to their memory—that is, set apart as belonging to them forever. And further, men were taught that to go on such pilgrimages was a virtuous act, which would help to atone for sins of which they had repented. The more difficult the journey was, and the more dangers and sufferings and discomforts the pilgrims had to endure on the way, the more complete they imagined the atonement would be; also, the more sacred the spot was to which pilgrimage was made, the greater they believed would be the merit of visiting it.

Now, of all the sacred places, the most holy were in Palestine: the places where the Savior had stood, the spot where He had been crucified, the spot where He had been laid in the tomb from which He later arose. Therefore, of all pilgrimages the pilgrimage to the Holy Land was that most highly valued; because, also, Palestine was distant and the journey was long and hard. For hundreds of years the Holy Land was a part of the Roman, or Byzantine, Empire, so that its rulers were Christians.

But at last there arose among the Arabs a certain Mahomet, or Mohammed, who preached a new religion, calling himself the Prophet of Allah, the Most High God, whose doctrine was called Islam, and his followers Mohammedans, or Moslems. And the Moslems conquered Egypt and Palestine and a great deal of the western part of Asia which had belonged to the Christian Byzantine Empire; so that Palestine became a part of what was called the Saracen Empire.

Now, at the first, the Saracens did not ill-treat the Christians, and the pilgrims were allowed to visit the Holy Land as before, though they had to make payment to the Saracen rulers. But presently the Turks, who had come into Western Asia from the East, and had turned Mohammedans, became the most powerful of all the races that dwelt in the Saracen Empire; and when they got the government of Palestine into their own hands, they began to

treat the Christians with great cruelty, so that it seemed likely enough that the pilgrims who went to the holy places would, in very deed, lose their lives and even become martyrs themselves.

THE MEN WHO CALLED UPON THE PEOPLE TO MAKE A HOLY WAR

Even before this, there had been some to whom it seemed a shameful thing that the land where Jesus had lived should be in the hands of unbelievers, although so long as they did not treat their Christian subjects harshly, and left the pilgrims in peace, the nations of the West were not minded to go to war with them just to help the emperor at Byzantium to win back lands which he had lost. But now there came a change; and first the great pope, Gregory VII, tried to persuade the peoples of Christendom to unite in trying to restore a Christian dominion in the Holy Land.

Pope Urban the Second rousing the people for the First Crusade. He summoned a council of bishops and nobles at Clermont, and preached to them and their followers, urging them to join a Holy War. When he had finished they cried: "It is the will of God! It is the will of God!"

Pope Gregory failed. But after him there came a pope named Urban II, who was exceedingly zealous in the matter; and to his aid came a man who was a most eloquent and fervid preacher, who was called Peter the Hermit. This Peter himself had been in the Holy Land, and with his own eyes had seen the cruelties that the Turks inflicted on the pilgrims; and he came back with his heart hot within him, and told the pope what things he had seen. And Urban bade him go forth and preach of these things. So he went to the great cities, riding upon an ass, and carrying before him a large crucifix; and his preaching stirred the hearts of all who heard him; and everywhere crowds gathered to listen to his words, which burned like fire. When he told them that now they might do a great work for Christ by going to rescue His sepulchre from the heathen infidels, and win pardon for all their sins, and everlasting salvation, a passion of enthusiasm took hold of them. Then Urban summoned a council of bishops and princes and nobles to meet and make an end of their quarrels among themselves, and to take counsel how the holy places might be won back from the Turks. So a vast multitude gathered at Clermont, which was the place of meeting. And after the people had taken counsel and agreed together, Pope Urban went out and preached to the immense crowd, urging them to take the Cross and to join the Holy War; and, when he had finished, all the people cried out as with one voice: "It is the will of God! It is the will of God!" Now, many nobles and many knights pledged themselves to join the army of Christendom which was to be gathered for the recovery of the Holy Sepulchre, under the leadership of Raymond, the count of Toulouse. But long before the army could be ready (because much preparation was necessary) there was a host of eager people clam-

oring that Peter the Hermit should lead them against the Paynim without delay; and, since they needs must have a soldier at their head as well as a hermit, they chose for leader a knight who was called Walter the Penniless.

The Crusaders set forth, being, indeed, no more than a vast rabble of ignorant folk, without order or discipline, who deemed that since they were journeying to the Holy Land they might do what they would by the way. And they did so much ill that wherever they went the peoples rose up against them in self-defense; and of all that rabble not one out of every ten ever reached Asia at all. The Saracens found it no hard task to destroy those who did arrive, save a very few, including Peter, who escaped back to Byzantium, which was another name for Constantinople. However, the army which the princes and nobles were gathering fared far differently. In that company were many famous warriors: Raymond of Toulouse, a baron whose power was greater than that of many kings; Tancred, the flower of knighthood, of whom in later years the famous Italian poet Tasso sang; Godfrey of Bouillon, noblest of them all, with his brothers Baldwin and Eustace of Boulogne; Bohemund of Tarentum, a Norman knight, whose father, Robert Guiscard, had carved himself a kingdom in southern Italy; Robert, Duke of Normandy, William the Conqueror's eldest son, whose brother, William Rufus, was king of England. So that he might have gold to equip his troops for the great enterprise, Robert had given his dukedom to the "Red King" in pledge, receiving from him a sum of money.

Richard the Lion-Hearted was the strongest knight and the most fearless fighter of his time. He led a large army to the Holy Land and captured Acre from the Turks. Here he is at the prow of his ship, entering Joppa. He won many victories over Saladin, the great Saracen chief.

DUKE ROBERT, WHO WAS HELD CAPTIVE BY HIS BROTHER FOR TWENTY YEARS

A very valiant knight was Duke Robert, but not over-wise; easily outwitted by fierce William and his craftier younger brother, who became king Henry I and by whom afterward Robert was taken prisoner in battle and held a captive in Cardiff Castle for twenty years until he died. Men said, though it may not be true, that the king had the luckless duke's eyes put out.

The way to Asia lay through the lands of the Byzantine Empire, where the emperor ruled at Constantinople; and little liking had he for the great host which was marching, not to win back his lost lands for him, but to drive out the Turks and set up a new Christian kingdom. But glad he was when the last of them had crossed the straits called the Bosporus, and stood on the soil of Asia. Even then, they had a long way to march before them, and many fierce battles with the Turks before they could reach Jerusalem, the

Holy City, the goal of their quest, for whose rescue they were come forth.

THE CRUSADERS FALL ON THEIR KNEES BEFORE JERUSALEM

Of these fights the fiercest was the long struggle at the city of Antioch, which the Crusaders held it needful to seize. Yet the Crusaders were unskilled in the art of sieges, and the Turks held the city stoutly. The siege lasted long; and, throughout, the boldest deeds were those of Godfrey of Bouillon and the Norman Robert. At last, however, a traitor within the gates made a plan to let in Bohemund of Tarentum with his knights; and so the town was taken. But still the citadel held out, and new armies came to help the Turks; so that the besiegers of the citadel were themselves besieged within the city. At last, however, the Christians sallied forth, and there was a great battle, which the Christians won; and after that the citadel itself surrendered. There Bohemund remained as lord. But the army of the Crusaders went on to Jerusalem itself.

Now, when they came in sight of the Holy City, the Crusaders fell on their knees, offering thanks that at length they had been permitted to behold what they had longed for; and so they made ready for the assault, since the city was very strong in its defenses.

HOW THE CRUSADERS SWEPT THE TURKS BEFORE THEM AND WON JERUSALEM

But on the first day, in spite of the fury of their attack, they were beaten back; whereby they learned that valor alone, lacking skill, would never gain them an entry. Therefore, they built engines of war for the storming of strong places, battering-rams, and catapults for hurling huge stones, as gunpowder had not at that time been invented. At last, after many days, during which they had suffered much from thirst, the assault was renewed. All one day they fought, and still the Saracens beat them back; but again they attacked in the morning. Now, while the battle raged, Godfrey saw on Mount Olivet a knight who waved a glittering shield; and he cried out: "Behold! St. George is come to aid us!" At that inspiring word the Christians were filled with a new strength, and rushed upon the Saracens; and this time they carried the rampart. The first on the top was Letold of Tournay, and the third was Godfrey. Then they swept the Turks before them; and Jerusalem was won by those who fought under the sign of the Cross.

Very fierce and cruel was the slaughter, and very few were they who sought to save the lives of the conquered, except Tancred; for men felt that it was right for them to slay and spare not, as in ancient days the Israelites had slain the Canaanites. But, after the slaughter, all went to pray and to humble themselves at the Holy Sepulchre; and after that they did honor to the hermit Peter, who had first roused them to the great enterprise and of whom thereafter we hear no more.

GODFREY OF BOUILLON, WHO MIGHT HAVE BEEN KING OF JERUSALEM

And then, when the chiefs had taken counsel together, they offered the crown of the kingdom of Jerusalem to Godfrey of Bouillon, the worthiest; though they would have been willing to give it to Duke Robert had he been willing to take it; and many to whom others had no will to give it were willing to take it. But Godfrey himself would in no wise wear an earthly crown in that city, where the King of Heaven had worn the crown of thorns; and so he called himself only the Baron and Defender of the Holy Sepulchre. Then Godfrey abode at Jerusalem, scattering the Saracens who came against him; and a year later he died, having just made good laws for the new kingdom. A wise man, honorable, valiant and just—a man who feared God but none other—was Godfrey of Bouillon.

To other knights were given other lordships, as Antioch to Bohemund, in whose absence Tancred ruled wisely and well, and Edessa to Baldwin, the brother of Godfrey; and this Baldwin was made king of Jerusalem when Godfrey died. Baldwin reigned for eighteen years; and after him came another Baldwin, not his son, but a kinsman. These two Baldwins brought more lands and cities under their dominion, which was known as the "Latin Kingdom"; and one of these cities was the famous Tyre. In those days were founded the two great Orders of the Knights Templars and the Knights Hospitallers, or Knights of St. John, who were vowed to fight as soldiers of the Cross, yet to remain poor and unwedded, like monks. Among them were many very valiant soldiers. After Baldwin II came Fulk of Anjou, and after him his son Baldwin III, in whose time the Turks won back Edessa.

Now, many pilgrims had come to Jeru-

salem, and many knights had come to Palestine to fight on behalf of the Christian kingdom against the Paynim, as the infidels were called; and these, too, were called Crusaders, or champions of the Cross. But because of the fall of Edessa, another great army was formed to march against the Saracens; and this is called the Second Crusade.

ST. BERNARD, AND HOW HE STARTED THE SECOND CRUSADE

This time the man who roused the princes of Christendom to the war was Bernard of Clairvaux, who is called St. Bernard, a man learned and eloquent, and of a fiery zeal. But though Conrad, the German emperor, and Louis VII, the French king, took part in this Crusade, and a vast host with them, yet it came to no good end, by reason of divided counsels and, what was worse, of treachery.

Being jealous of each other, some of the great lords willfully gave evil advice, so that when the crusading army came to battle with the Saracens they were defeated. But, as for Bernard, he held that the army had been defeated because the Crusaders had not marched with a single eye to the honor of God, and therefore God had not given them the victory. In this Bernard judged wisely. It may be that, if he himself had gone with the Crusaders to encourage them, a nobler spirit would have possessed them.

Nevertheless, though this Crusade came to nought and Edessa was lost, the young king Baldwin of Jerusalem held his own against the Turks, and even won the city of Askelon. But now evil days were in store; for there rose up in Egypt, which was ruled by the Saracens, a young man whom the Christians called Saladin, who, being just appointed vizier, or chief minister, by the sultan of Egypt, presently made himself master not only of Egypt, but also of Syria. And all men agree in speaking the praises of this Saladin as a wise and just ruler and a very valiant and courteous knight, for all he was no Christian, but a Moslem.

THE MERCY OF SALADIN, THE EMPEROR WHO WENT UP AGAINST JERUSALEM

And, indeed, not Saladin only, but other great leaders of the Saracens had shown that they could match the best of the Christians in true chivalry and gentlehood. But while Saladin waxed strong, Baldwin died, and two more Baldwins after him. And one, Guy of Lusignan, became king of Jerusalem. But now Saladin was minded to win back Palestine; and he went up against the king of Jerusalem with a great army and overthrew him at Tiberias, and took him prisoner. Then, one after another, the cities of Palestine surrendered to him, save Tyre, where Conrad of Montferrat defied him, and Jerusalem itself. But to Jerusalem he offered very generous terms if the people would surrender; and though at first they would not, yet, after a short while, when he promised to show the people mercy and do nothing more, Jerusalem, too, surrendered.

And even so, the mercy of Saladin was far more generous than the mercilessness of the Crusaders when they won the Holy City, Jerusalem.

THE THIRD CRUSADE, IN WHICH PRINCES & KINGS MARCHED TO THE HOLY LAND

But when the peoples of Western Christendom heard that Jerusalem was once more in the hands of the Turks, a third great Crusade was resolved on, wherein princes and kings took part, and chief of them Philip Augustus, the young king of France, and Richard, the heir to the throne of England, who became King Richard I while preparation was yet being made; and because Richard was the strongest knight and the most fearless fighter living, men called him Richard Cœur de Lion, or Lion-Heart. Yet even more renowned and mighty than the kings of England and France was the German emperor Frederick, who was called Barbarossa because of his red beard.

While the other kings and nobles were settling their own quarrels, or making preparation for this Third Crusade, Barbarossa marched by land at the head of a mighty army past Constantinople into Asia, and it seemed likely enough that Saladin would meet more than his match. But Barbarossa died suddenly, whether he was drowned, as some say, in crossing a river, or from a sharp sickness caught from bathing therein; and the most part of his army perished miserably, though a part reached Antioch and conquered it again.

But now, while Richard Lion-Heart still tarried in Sicily, Philip of France and most of the army came by sea to Palestine, and sat down to besiege the fortress of Acre, where Richard, following, when that the summer was come, presently found them, more intent on a quarrel

whether Conrad of Montferrat or Guy of Lusignan should be king of Jerusalem than on war with the Saracens.

How Richard the Lion-Hearted Hid His Face Before Jerusalem

Now, although the Christian kings and nobles ranged themselves on the side of Guy or of Conrad, Philip supporting the one, and Richard the other, and although each of them sought to thwart his neighbor, and the whole camp was full of feuds and jealousies, yet, chiefly through the prowess of Richard, Acre was captured. Nevertheless, there were bitter quarrels between King Richard and the wily French king, and also the Austrian duke Leopold, whom Richard treated with open scorn, for which he paid dearly enough later. But after the fall of Acre Philip and Leopold and many others deemed that they had fulfilled their vow as Crusaders, and betook themselves home again; but Richard remained, being full of zeal to win back Jerusalem.

Yet this was not to be; for now the crusading army was but small, and the hosts of Saladin outnumbered them many times. And so, though the king of England marched against Jerusalem, he knew, before he reached it, that the attempt must be in vain. Therefore, when he came within sight of it, he hid his face as one unworthy to behold the Holy City, which he could not rescue, and turned back again. Yet, whenever he came to battle with the Saracens, he wrought such mighty deeds of valor that he won from Saladin terms for a truce, hoping that, though now he must turn away, he might yet return and do battle for the Holy Sepulchre.

How Richard Was Slain by an Arrow & the Crusaders Went Forth Again

Yet, this, too, was denied him, for on his way to England, traveling alone, he fell into the hands of his enemy Leopold of Austria, and was held prisoner for a long time before he was ransomed at a great price; and not long afterward he was slain by an arrow in some small war.

But men tell of the high honor in which he and the Sultan Saladin held each other; and how for many a long year the Saracen mothers would frighten their children, when they were naughty, with the name of Richard Lion-Heart.

Now, less than a hundred years had passed since Godfrey of Bouillon and the warriors of the First Crusade had won back Jerusalem from the Turks and set up the Latin kingdom. Yet Saladin had in truth overthrown the Latin kingdom for good and all, though still the name of it was kept up. But for a hundred years more, Crusades were undertaken from time to time, though, because the princes of Western Christendom would never unite together loyally, the Moslem still held Jerusalem, and Christendom only in our own day and generation have won it back.

Of the men who went upon the Fourth and Fifth Crusades there is nothing good to tell; and as for the Fourth, it was turned not against the Paynim at all, but against the Christian empire of Byzantium.

The Shameful and Pitiful Tale of the Children's Crusade

There is another story about the Crusades which does not really belong to our Book of Men and Women, for it tells of a multitude of children who were allowed to set out on a Crusade of their own. We must suppose that their parents let them go believing that God would work a miracle on their behalf. Yet the Bible does not tell us that if people do a very foolish thing God will save them from the consequences of their folly by a miracle. At any rate, a vast number of children were suffered to gather together in France, and to march down to the sea to travel to the Holy Land. But of these thirty thousand children ten thousand had already strayed away before ever they reached the sea; and whether any of them got home again, no one knows. When the rest reached the sea, the luckless children fancied that God would drive the waters back, so that they might journey on to Palestine dryshod, as the children of Israel passed through the Red Sea. Yet, while they waited in that vain hope, certain evil-minded folk saw their plight, and said, "We will take you on our ships, as many as we can, not for money, but for the love of the Holy Cross"; and so they took some five thousand of these children aboard. Now they sailed away joyfully; but when they had crossed the sea, those evil folk took them down to the slave-markets of the Turks, and sold them all.

Nine Crusades are counted in all, and though great men were numbered among those who took the Cross, such as the German emperor Frederick II, and in the last Crusade the English prince Edward, who became Edward I; yet it seems as if

there was only one of them who sought the Holy Land with a pure heart for the glory of God. That one was Louis IX, king of France, who is called St. Louis; for he, having approved himself one of the best of all kings in his own land, and having won such repute for wisdom and virtue that men came to him even from other lands to judge between them and pronounce what was just, now left his kingdom in obedience to what he deemed the divine call.

Nevertheless, for all his singleness of heart, he, too, was doomed to fail, for there were folly and jealousy among the leaders, and Louis himself lacked the skill of a great general. And so it befell that at last, when the army was already well-nigh broken in pieces, a great host of Saracens came upon them and overthrew them, though Louis himself and many another fought valiantly. Louis himself was taken prisoner and was set free only for a very great ransom. After him there is no other Crusader to be noted, unless it be Edward of England, of whom we read on page 1679. But of all the men who went on Crusade, although Richard Lion-Heart won the greatest renown for pure prowess in battle, yet the names which claim highest honor are those of Godfrey of Bouillon and Louis of France.

True knights of the Cross which was their standard, they fought not for worldly fame or personal gain, but only to fulfil the will of God as they believed it was revealed to them. Godfrey was a man of action, ever in the forefront of battle, yet was he also a man of prayer, devoted in his piety. When at last mortal illness fell upon him, he was near the seaport of Jaffa; but he had himself borne to Jerusalem, and there he breathed his last in the Holy City of his Lord. In after years a fair tissue of song and legend was woven around his name.

Of Louis we read in the chronicles of Lord de Joinville, his seneschal: "This holy man, King St. Louis, loved and feared God during his life above all things.

"The holy king loved truth so much, that even to the Saracens and infidels, he would never lie nor break his word in anything he had promised them. . . . With regard to his food, he was extremely temperate; for I never in my whole life heard him express a wish for any delicacies in eating or drinking."

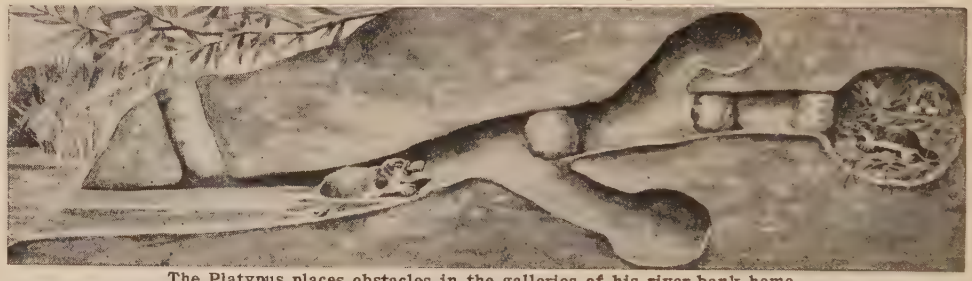
Yet no weakling was he who, a captive under threat of torture, would not yield the Christian fortresses in Palestine nor forswear his faith.

The Sultan Saladin was the great champion of the Saracens against Christianity. He was not only a valiant fighter but a chivalrous man, and held King Richard Lion-Heart in such honor that, though he defeated him, he asked him to come and see him and made a truce with him. This picture shows their meeting.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 2721.

A QUEER CHILD OF MOTHER NATURE

The duck-billed Platypus at home in his burrow leading out of the river bank.



The Platypus places obstacles in the galleries of his river-bank home.

The queer Platypus, almost the only mammal whose young are born from eggs.

The queer little Echidna of Australasia.

ANIMALS THAT LAY EGGS

CONTINUED FROM 2510

IT is good to be young in these days, to learn startling truths of science with the same ease and certainty as we learn the alphabet. Things once thought impossible are now as well established as that two and two make four. Here we are to read of a very great marvel which is well known now, though a generation ago it would have kept a scientific man awake at night.

We are now beginning the end of the great chapter which embraces all classes of the highest order of life—the mammals—and find ourselves in a wonderland. We have studied all the mammals except one group. We have found that all have certain characteristics: that they are warm-blooded, that they have hair or fur, that they produce their young as animals and not as eggs.

We have been looking at the kangaroos and their kind. We see in that group queer animals whose young are born tiny and undeveloped. They must grow into shape and size and functions after birth. It seemed as if we could go no lower in the scale without reaching birds and reptiles which lay eggs. Within the shell are germs of life associated with yolk and fluid. But before we say adieu to the mammals we have to discover that there are mammals which, like birds and reptiles, really do lay eggs. But can animals which lay eggs be true mammals? Are they not reptiles? No reptile is hairy or warm-blooded. Are they not a type apart, distinct from all other orders? They have the main features of other existing mammals, though they have traits and features resembling birds, and more closely reptiles.

Down to a generation ago nobody believed this egg-laying feat of the Monotremata, as these animals are called. There was no parallel in life to it; nothing, it was thought, to hint the possibility of such a thing. It seemed natural that Nature should create a chasm between the various orders of created things and make mammals as distinct from all other creatures as water is from fire. That is not Nature's way. We see how all the horses, asses and zebras are kin; how the deer and antelopes and cattle are connected; how the hyrax is a distant cousin of the elephant; how pigs and hippos are similarly linked.

AN EGG AND THE MARVELOUS PART IT PLAYS IN THE WORLD

All life issues from an egg, or ovum—oak, orang or alligator. What Nature has had to decide in each case is the most advantageous condition for the young when it enters the world.

The guinea pig is practically perfect at birth, and eats and runs about at once; the baby giraffe is actually born with horns. The kitten and baby lion are blind and dependent. But, whatever their condition at birth, they proceed from eggs which have been hatched before the young are born.

With egg-laying the case is different. There the parent creature, instead of unconsciously hatching the egg while going about its daily concerns, plays the waiting mother after the egg has left the body. Even with egg-layers, however, there is no certain rule. The eggs of a frog or a toad must lie soaking in the water for days before the little jelly-like mass within becomes the wriggling tadpole; yet a salamander lays an egg which produces young and hatches almost immediately. From that it is but a step to the method of some of the snakes. Here we have reptiles which nurse their eggs like a brooding hen; yet others retain the eggs so long within the body that they hatch there, and young snakes, not eggs, appear.

We cannot know why there should be these differences: why some animals should take months to complete incubation, while others should produce their eggs as soon as they are formed. But there is the fact.

THE GULF WE COULD HARDLY BELIEVE IF WE DID NOT SEE IT

Once upon a time there were many egg-laying mammals. There are only two mammals left—the Platypus and the Echidna—which now lay eggs. Between the highest orders of mammals and those to which we now come there is a vast gulf. Books could never have brought home the wonder to our minds, and we should never have believed it if we had not seen with our eyes.

As we have seen, the Monotremata comprise only two types of animal. We will look at the Platypus first. It is the strangest animal in the world. When the first stuffed specimens of this creature were brought to England they were denounced as frauds. Here was an animal with mole-like fur, with a short tail flattened like that of a beaver, with all its four feet webbed, but with a beak like a duck. But the thing was entirely genuine; the features described are the features of the living animal, except that in the living specimen the horny beak has a fleshy covering.

THE SUBTERRANEAN FORTRESS WITH A SUBMARINE BACK DOOR

So the creature was given a variety of names, such as Duckbill, Duck-mole, Water-mole, and so on, while the first attempts of science to find it a name resulted in a set of terms which worked out in English as "bird-billed broad-footed puzzle."

Most of the mystery has vanished now, and we know all there is to be learned, except one particular, as to the composition and life habits of the male and female Platypus. The adult is about twenty inches long; dark brown on the upper parts of the body and whitish below; with small deep-set eyes like the mole's; with large bird-like openings for ears, but with no shell, or conch, such as mammal ears usually have.

The home of these creatures is in the rivers of Australia and Tasmania, but not in all rivers, nor in all parts of rivers. As the beaver makes a dam to secure constant depth of water, so the duckbill chooses sites where the river widens into quiet, deep pools which outlast the summer, even though the stream itself dries up. And there the Platypus is at home. There it passes such time as is not devoted to its burrow. The burrow is quite an ambitious engineering task for so simple an animal.

It is a subterranean gallery from the water into the bank. One hole or tunnel opens beneath the surface of the water, enabling the Platypus to enter and leave unseen by enemies. The other opens above ground. This gives a second way in and out, and also admits air.

THE MOTHER PLATYPUS AND THE EGGS SHE LAYS DOWN IN THE EARTH

Such galleries may be twenty feet long, but the more extensive run to fifty feet and upward. The home may be made parallel to the water or may be boldly run at right angles with the pool. In any case there are fairly ingenious windings before the little dwelling-place is reached.

These galleries are constructed whatever the character of the soil may be. The soil may be stony; it is almost sure to be laced about with roots of trees. The ligament of the forefeet of this web-footed animal extends beyond the toes. It would seem to be impossible to do mining with them. But there is a beautiful adaptation to life in these paws. The web folds back like a little umbrella into

the palm, and the sharp, tough nails are left exposed and unhindered for the work of constructing their homes.

In the depths of the burrow the mother Platypus lays her two eggs. She coils herself about them, snuggles them to her warm body, and hatches them like a bird or a snake. The little ones emerge from an egg very small, blind and naked, and with a beak like a duckling's.

THE EXTRAORDINARY CHANGES THAT TAKE PLACE IN THE YOUNG PLATYPUS

Now this beak at the outset is smooth and fleshy, and round in shape. It forms a capital instrument for sucking milk from the glands of the mother. Thus this primitive creature is in advance of the kangaroo: it can voluntarily feed itself as soon as it is hatched, whereas the baby kangaroo must have milk forced down into its stomach.

As the youngster grows up, teeth appear in the bird-like bill. There are several pairs in the jaws, and they are true teeth, enabling the youngster to eat as any other mammal eats. But in taking up its food from the sandy bed of its pool the teeth become worn down, the horny parts of the jaws grow up; the teeth vanish, and ridges of horn, straight along the jaws and across the palate, as in the bill of a duck, take the place of good, natural teeth.

Such a change would seem unprofitable to the animal, but Nature knows best. The food consists of water animals, worms, insects, and little shelled animals. The hard, horny bill cracks these shells more efficiently than sharp teeth could do.

Obviously the chief supply of food must come from under water, and the result is that we find another unexpected adaptation to conditions. The Platypus has cheek-pouches like some monkeys and rodents, and in these it stores its prey while seeking below. It can remain under water six or seven minutes at a time. Then it rises to breathe and to eat at leisure the booty it has gained.

The Platypus is one of the most timid and wary of beasts, infinitely difficult to approach. To catch it alive men set nets, with an opening at the surface so that when captured in the water the Platypus must rise either to breathe or drown. While the temperature of mammals is ordinarily constant, that of the egg-laying mammals varies with the heat of the air as is the case with reptiles.

HOW THE STRANGE ANIMAL WAS DISCOVERED

The fact that these wonders existed in the world was until our time known only to savages, the blackfellows of Australia. They told white men about them, and led them to their haunts. One of the best books on Australian life was that of a man who was led by a blackfellow to the haunts of the Platypus. He saw the animals at play and at work, caught two adults, ate one, examined them, bottled young ones in alcohol, and learned all that his guides could tell him of the little creatures. Yet he ended the description of his experiences with a grave warning against believing the tales of the natives. "For," said he, "the credulous creatures say that the Platypus lays eggs."

Though his tale seemed convincing, British scientists could not rest content while so challenging a point remained unsolved, and the Royal Society sent an expedition from England to Australia, halfway round the world, for the purpose of settling the question. That was in 1884, the first year in which the British Association held its annual meeting beyond the boundaries of the British Isles. No survivor of that gathering will ever forget it, for the Platypus made it memorable.

THE STORY OF A SCIENTIST'S TELEGRAM FROM AUSTRALIA

The President of the Natural History Section received news that a son he had left at home in England was ill. He cabled home for further particulars and in due course received a cablegram which he hoped contained better tidings. He handed it to his wife so that she should have the pleasure of being the first to read the expected news.

She opened the message and uttered a gasp of astonishment and disappointment, for what the cablegram contained was this: "The Duck-billed Platypus is oviparous." It was a message from the Royal Society's scientist in the wilds, and here was his news from Australia telling of his discovery that the Duckbill really does lay eggs.

Since those days we have had much experience of the Platypus, though until 1923 it had been impossible to get the little creature alive out of Australia. There naturalists had kept specimens, and found the young playful, able to eat soaked bread and hard-boiled eggs, able

to climb astonishingly up bookcases and doors by using their claws.

THE QUEER STRANGER FROM AUSTRALIA ARRIVES IN AMERICA

In 1923 a cargo of six living duckbills began a voyage across the Pacific to America. It was a great day in the history of the Platypus race, the first time any of these creatures had left Australia. Unhappily, five died on the way, but one landed alive at San Francisco and made the journey by rail right across the continent to New York.

No royalty could have received greater care and attention than this queer immigrant. It was fed with shrimps and worms, and was carried in a special cage which had a water supply. At every stopping-place a telegram sent in advance insured a supply of fresh water.

The little animal finally arrived at the New York Zoölogical Park, which paid $1,400 for it, though it was only half grown and about the size of a gray squirrel. It seemed quite excitable, and the authorities decided that it should be exhibited less than an hour every day. A special cage was prepared and a keeper was always in attendance. As the animal was young, a full-grown specimen preserved in alcohol was exhibited in a jar near by.

The little animal lived just seven weeks, and was seen during that time by nearly 175,000 people. When displeased or alarmed it grunted something like a little pig. Its favorite food was angleworms, the grubs of the June bug, and shrimps. Every day it ate about a half-pound of worms, forty grubs and forty shrimps. Finally it seemed to grow sluggish and died, whether from the climate, from excitement, from confinement, or because it missed some particular food it found in its native streams, no one can say. It will probably be a long time before another is seen in captivity. It is too expensive and too delicate to become common in zoölogical gardens. They cannot afford to pay such large sums of money for animals which do not thrive in captivity.

THE ECHIDNA, WHICH IS NOT SO DELICATE

For the only existing parallel to the Platypus we must turn to the Echidna, which is not so delicate. Good specimens have lived for considerable periods in London and elsewhere. There are two species of Echidna. One ranges through Australia, Tasmania and New Guinea, and the other is limited to northwestern New Guinea. Some naturalists divide the latter into two separate species.

When we know that the common names of these animals are the Spiny Ant-eater and the Porcupine Ant-eater, we have a rough-and-ready description of their outline and habits. But we must not content ourselves with so hasty a survey as that, or we miss the chief feature associating it with the Platypus and marking it off from all other mammals. It is quite different from the ant-eaters of South America, or from the Aard-vark of Africa.

THE MOTHER WHO PICKS UP HER EGG AND DROPS IT INTO A POUCH

For these two Echidnas are egg-layers which have gone a step farther than the Platypus. The mother Echidna, when she lays her single egg, picks it up with her strange bird-like mouth, places it in a little pouch, and carries it there till it hatches. There is no brooding here in the way pursued by the Platypus; the mother's cradle does the incubating. When the baby is fully formed in the shell it carries on its head a horny projection matching what we call the egg-tooth of a bird. With this it breaks its shell and enters the little world of the mother's pouch. Like the Platypus, it is nourished on the mother's milk.

In the pouch the young Echidna becomes a half-grown Echidna. The mother takes it out to exercise it and perhaps to give herself a rest, but at each need for food she gives it a lift back to its nursery with her mouth. At night, when she goes out for food, she always puts the little one out of her pouch and goes forth alone. When the hunt for food has been successful, she returns home. Here we see marked differences between the Echidna and the Duckbill.

There are others. The Echidnas are furry externally, but traps lurk within that innocent-looking covering. The coat is pierced by a multitude of prickles and barbs. The prickles are not continuous, like those of the hedgehog, but occur at intervals. Echidnas have often been tamed but they are decidedly painful pets. The sharp spines pierce the hands of one who holds them, like needles.

The only way by which one can be carried is to seize it by one of the hind legs,

which are free from spines. However, as it has the habit of rolling itself into a ball, it is rather difficult to grasp a leg.

THE CURIOUS ECHIDNA LIKE A LITTLE NIGHTMARE ELEPHANT

The smaller and commoner Echidnas have five toes to each foot, all rounded off with sharp, powerful claws. The head is beak-like, and the toothless mouth is furnished with a long, sticky tongue. The food consists almost entirely of ants. The powerful claws tell at a glance the manner in which they dig down to the prey which the agile gluey tongue will lick up.

The three-toed Echidna reaches a considerable size—four feet long and of considerable bulk. The broad rounded head terminates in a beak which curves downward, continuing the arched line of the back. This outline, together with the way the legs are placed, suggests a tiny nightmare fancy of an African elephant. But the legs call to mind those of the sloth in form. The hind feet, when the animal walks, have the big, menacing claws turned outward and backward.

But it is with the heavily clawed forefeet that this Echidna does the serious business of life. Like the true ant-eater, it is a great digger. It tears its way into an ant-hill as neatly as a bear tears a honeycomb. The ants pour through the opening to repel invasion and seize upon a long, sticky ribbon. They find that ribbon alive—a tongue ready instantly to whisk them down the throat of the marauder whom they had come forth to challenge.

These strong claws also help it to escape capture, for it can disappear into the ground within a very few minutes. When in captivity it is restless and constantly strives to escape by burrowing. The bottom of its pen must be solid, or it will be able to gain its freedom.

THE RACE OF MOUNTAINEERS THAT HAS COME DOWN

These larger animals are blue-black in fur, with lighter patches here and there. They are furnished with short, terrible spines, justifying the local name of porcupine.

The wide distribution of the smaller Echidnas seems to mean that they can adapt themselves better to conditions than the three-toed variety. These creatures are confined almost wholly to mountainous regions. They are found at considerable heights, but of course there is a rich vegetation there, with a corresponding wealth of insect life. Their hold on existence seems precarious. Though they add worms and other insects to their ant diet, ants are their mainstay. If disease or change of climate should affect this supply, they would all perish in a season, so limited is their range of homes. In the stomach and intestines of specimens which have been taken, large quantities of sand and mud are found. It seems that these are necessary to the digestion of its diet of insects.

That they have lasted so long is proof that there has been no such change for long ages of time. All these egg-laying mammals are a source of wonder to us. That sense of marvel is not lessened when we see how tied to the water is the Platypus in a land where scarcity of water is usual. There have been much larger Echidnas than any which now exist, but there have been no larger Duckbills. The present examples are larger than those whose remains geologists find amid fossil deposits. The Platypus is therefore one of the few mammals which have not had giants among their forefathers.

THE STRANGE ANIMALS WITH MANY CURIOUS QUALITIES

We cannot imagine any other animal which so closely unites the qualities of bird, beast and reptile as these egg-layers do. The Platypus and the Echidna are lowly mammals, but they are in themselves finished products as well. Their kindred have passed on; some have scaled enormous heights, some have died out leaving not a single representative behind them. But these humble animals of far and long-silent Australasia have remained where they were, and have survived—veritable living milestones—from far, far back in time.

This southern continent on the other side of the world is a strange land. Both the animal and the plant life present many curious features which differ widely from those to which we are accustomed. The kangaroos and other pouched animals, the Echidna and the Platypus seem to belong to an unreal world. It is hard to believe that such animals really exist. We shall find that the birds are also strange, and that there are many curious plants also. When the fossil beds are thoroughly explored many other queer animals may come to light.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 2757.

THE DWARFS FIND SNOWDROP ASLEEP

When it was quite dark the seven dwarfs returned, lit their seven lamps and entered their cottage. On the bed they found little Snowdrop fast asleep. "How beautiful she is!" they exclaimed all together.

SNOWDROP AND THE DWARFS

CONTINUED FROM 2461

ONE winter's day, when the snow lay deep on the ground, a gentle Queen sat by her window working. As she worked she pricked her finger, so that two little drops of blood fell from it.

The Queen sighed and said: "How I wish that I might have a little daughter with cheeks as rosy as those drops of blood, with a skin as white as snow and hair as black as the ebony window-frame!"

To her great delight the Queen's wish was granted, and before long a little daughter came, whom she named Snowdrop.

Soon after this the good Queen died, and Snowdrop's father, the King, married another lady, very beautiful, but very unkind and vain. She knew that she was the most beautiful lady in the land, because when she looked into her magic mirror, and asked:

"Say, glass that hangest on the wall,
Who is the fairest of beauties all?"

the glass would always answer:

"Thou, Queen, art fairest of beauties all."

As the years rolled by, little Snowdrop grew into a very sweet and lovely girl, and one day when the vain Queen asked the glass the old, old question, to her great surprise it replied:

"Fair and lovely though the queen,
Snowdrop lovelier far, I ween."

This sent the jealous Queen into such a frightful rage that she immediately summoned her servants and gave orders for Snowdrop to be killed. But all the people in the castle loved Snowdrop, and instead of killing her one of them, a good, kind girl, took her into a wood and there left her, in the hope that somebody might see her and befriend her.

Left alone, poor Snowdrop wandered about in the wood until she came to a little cottage. She opened the door and went in. Inside she found seven little beds, seven little loaves and seven little glasses of wine. She ate a good supper, and then, being very tired, she lay down and fell fast asleep.

Now, the cottage belonged to seven dwarfs; and when it was quite dark they returned, lighted their seven lamps, and entered. On the bed they found a lovely maiden asleep.

"How beautiful she is!" they exclaimed, all together.

At this Snowdrop awoke and sat up in bed.

"Do not be afraid," said the dwarfs, "for you are among friends. But, tell us, how came you here?"

Then Snowdrop told her story, and the dwarfs, who were charmed with her beauty and sweetness, offered her a home.

"But," said they, "be careful to keep the door fast while we are away lest the jealous Queen find you and do you harm."

Sure enough the Queen did find out where Snowdrop was, and dressing

herself up as an old woman, she set off for the cottage. Presently Snowdrop heard somebody calling: "Fine wares to sell! Fine wares to sell!"

She opened the window and leaned out, and indeed the ribbons and laces that she saw before her were so pretty that, forgetting all about the dwarfs' warning, she unbolted the door and ran out.

"I think I will buy some laces," she said.

"Let me fasten them into your dress for you," said the old woman, who at once set to work to tie them so tightly that little Snowdrop fell down as if dead.

"There is an end to all your beauty," said the wicked Queen.

Soon the dwarfs came home, and they no sooner saw Snowdrop than they guessed what had happened. Quick as lightning one of them drew out a knife and cut the cruel lace. In a few minutes Snowdrop revived and related her story. When they went away the next morning the dwarfs again warned Snowdrop not to open the door to anybody until they returned.

Late in the afternoon Snowdrop looked out of her window and saw a strange old woman in a red shawl with a basket on her arm.

"Fine wares to sell! Fine wares to sell!" she called.

"What have you to sell?" asked Snowdrop.

"Come to the door and I will show you," answered the old woman.

"I dare not," said Snowdrop. "But, oh, what beautiful combs!"

"Try one on," said the old woman, handing one in at the window.

Snowdrop took it in her hand, but the comb was poisoned, and when it touched her hair she fell down as if dead.

Soon the dwarfs came home. They saw the comb and drew it out, and immediately Snowdrop revived.

As soon as the wicked Queen learned that Snowdrop had escaped her a second time she painted her face, dressed herself as a peasant, and went again to the cottage. This time she took with her a beautiful apple which she had filled on one side with poison.

"Would you like this pretty apple?" she said, holding it up to Snowdrop as she leaned out of the window.

But Snowdrop was wise now, and would not take it.

"Perhaps you think it is poisoned," said the old woman. "See, I shall eat of the white side and you shall eat the red."

The apple did look very tempting, and as the old woman had eaten of it, it certainly could not be poisoned, thought Snowdrop. So she put out her hand, took the apple and put it to her lips. But no sooner had she taken one mouthful than she fell down on the floor as if dead.

Then the Queen returned to the palace, and taking her magic mirror in her hand, asked:

"Who is the fairest of beauties all?"

This time the mirror answered:

"Thou, Queen, art fairest of beauties all."

Then the Queen knew that at last Snowdrop was dead.

At dusk the dwarfs returned to the cottage as usual, but this time all their efforts to restore her were useless. Snowdrop was dead. Sorrowfully they dressed her in a beautiful robe, and placed her in a crystal box ornamented with gold, and set it on a hill for everyone to see.

One day a Prince passed that way, and he was so struck with Snowdrop's beauty that he paid the dwarfs a large sum of money to allow him to carry her box away. As it was lifted down, one of the servants stumbled and fell. The door of the crystal box flew open, the piece of poisoned apple fell out of Snowdrop's mouth and she revived and sat up at once.

"Where am I?" she asked.

The prince, who was overjoyed to find that the beautiful lady was still alive, came forward and helped her down. He had learned the story of the jealous Queen's wickedness from the dwarfs, and so he was able to tell Snowdrop what had happened after she had taken a bite from the poisoned apple.

"I love you better than anyone in the world," he said, when he had told her all. "Come with me and be my bride."

Snowdrop smiled and gave him her hand, and went away with her Prince to his father's palace, where they married and lived happily ever after.

The Queen was invited to the wedding; but she was so furious that the Prince's love had brought Snowdrop to life again that she fell down in a fit, from which she never recovered.

HOW THE FRENCH REACHED MOSCOW

IT is a fine thing for an army in a foreign country, which has marched and starved and thirsted for many weeks, to see at last a great city raising its spires in the air and sending the smoke from thousands of chimneys into the wide dome of the sky.

Such a sight as this met the Grand Army of Napoleon in Russia. And the city was Moscow. After desperate battles, after heroic marches through the most wild and desolate country, thirsty, hungry, wounded and weary, the French soldiers at last beheld the magnificence of the Russian's holy city flashing and sparkling in the air.

NAPOLEON'S MARCH THROUGH THE SILENT STREETS OF A SPLENDID CITY

No Russian army disputed their approach. They marched toward this great city, which was crammed with merchandise, provisions and wealth, as if it were their own Paris. Not a shot was fired. Not a soldier was to be seen. What had happened?

The truth is that, as Napoleon approached the city at one end, the Russian soldiers were marching out at the other.

So it came about that Napoleon rode at the head of his great army into this magnificent city and found no one to stop him. The Russian people could hardly believe that it was Napoleon. They were taken completely by surprise.

The wife of a priest was sitting at her window knitting a stocking when the deacon's wife came running to her with the news that Napoleon had come. The priest's wife called to her husband, who was writing in the next room: "Do you hear this? Napoleon is here!" The priest did not stop writing. He laughed. "Do not be stupid," he answered; "go and make the tea." No one believed that Moscow had fallen.

THE GREAT MYSTERY OF MOSCOW AND ITS AWFUL DOOM

The French soldiers could not understand the silence. The city was deadly still. Street after street was traveled through and nothing happened. The bands of their army played "The Victory is Ours," but no one came to listen or to sing. The soldiers looked up at the windows of the houses, half expecting shots to be fired at them; not a face stared out. They began to feel frightened.

In an hour's time the awful, the terrible, the indescribable horrors of plunder had begun. Can you not imagine what it must be when thousands of starving and thirsty soldiers are turned loose in a rich city filled with unarmed men and women? You can imagine some of the horrors; but, thank God, you cannot imagine all. We dare not write them down.

Soon, very soon, the splendid city of Moscow was filled with terror. Shrieks of "Murder!" rose from every street. People were seen running wildly, with blood upon their faces, crying, "Murder, murder!" with the soldiers in pursuit.

Nothing was sacred—not even the holy women who give their lives to the poor. Churches were plundered. Treasures of art were destroyed. Sacred things were thrown to the fire. A mad and drunken soldiery went hither and thither, bursting into private houses, running up the stairs, entering the rooms of the sick, the dying and the dead, stealing and murdering, behaving like wild beasts.

There was but one cry in the city—the scream of "Murder!" The poor people of Moscow found themselves in the power of evil.

THE BEAUTIFUL CITY OF MOSCOW BECAME A VAST BONFIRE

Suddenly a cloud of smoke rolled upward into the darkening sky, and a thin tongue of scarlet flame licked through it, dancing in a shower of sparks. Then the same thing occurred in another quarter of the city, then in another. The smoke rolled upward, the flames shot through the clouds.

"Our soldiers are setting fire to the places they have sacked," thought the French generals. "We shall have to be careful. To-morrow we will see to it. Let us go to the theatre to-night."

But it was not the French soldiers. It was the Russian people. The citizens of Moscow were burning their own city, the sacred city of Moscow. They had no arms; they could neither resist the French nor avenge the dreadful things done to their wives and children; but they could burn the city and leave the French to perish.

While the work of murder went on, the flames crept forward. The soldiers drank—the city burned.

In a very short time great districts were nothing more than gigantic bonfires. Churches and palaces quivered in sheets of flame. The noise was like a whirlwind. The heat was like a furnace. In streets far from the blaze the stones became so hot that they burned leather soles. The gutters were filled with leaping floods of molten copper and lead, streaming from the roofs of churches and houses. French soldiers sought to check the conflagration.

For four nights they toiled—four nights in which no lamps or candles were needed, so vivid was the light of the victorious flames. Shrieks of "Murder!" still issued from the houses. Women and children still ran screaming from their butchers. Old men were still beaten to their knees in the streets. Nuns and Sisters of Mercy still tore hither and thither to escape the soldiers. Little boys and girls still ran and hid in cellars. Everywhere still sounded the terrified shrieks and screams of the poor Russians. But louder than their shrieks roared the great fire; and fiercer than the French were the scorching flames which leaped from roof to roof, from street to street, from square to square, like a tempest of fire.

A wind blew hard on the flames and fanned them as a blacksmith fans his furnace. The noise was deafening. The heat singed the hair on the face, cracked the lips and suffocated the lungs. On and on came the fire. With bellow-like thunder the mighty roof of a cathedral crashed down, and up whirled a black mass of smoke, pierced presently by a thousand tongues of scarlet fire.

Glass melted and ran with streams of lead through the streets. Trees burned away like matches. Houses of wood vanished in one lick of the red flames. On and on. No one could stop it now. The wind blew victory to the flames and they consumed it.

Then Napoleon began his retreat.

Suddenly in the midst of the clamor there came a bursting roar, which shook every stone in the city and deafened the ears of the people. The great arsenal had exploded. People went mad from that shock. Palace walls were split as an ax splits a log.

Outside Moscow Napoleon was marching away with his army, back over the thousands of desolate miles he had already come. He turned at the sound of the great explosion and looked with wrath at the smoking ruin.

In Moscow he had reckoned to find provisions for his troops, so that he might advance again, from victory to victory.

Now he was retreating from a heap of cinders. Fire had defeated him.

He turned his head and continued the retreat. The way was long. No cities broke its monotony. And there on that long path, waiting to destroy him, waiting to seize him with hands of ice, and breathe upon his brain the deadly cold of despair, was Winter, White Winter, the other wing of the destroying angel who is Flame and Snow.

IN THE DAYS WHEN MEN WERE GOOD

IN the days when all men were good they were given miraculous power. Lions, mountains, whales and forests, and birds, rocks, clouds and seas moved quietly from place to place, just as men ordered them. But the human race at last lost its miraculous power through the laziness of a certain man. He was a Bulgarian woodman, and one morning he went to a forest in the Balkan Mountains and cut firewood.

"Now march off home," he said.

The great bundle of wood at once got up and began to walk, and the woodman tramped on behind it. So far, so good. But the woodman was a very lazy man.

"Now, why shouldn't I ride instead of tramping along the dusty road?" he said to himself. And he jumped up on the bundle of wood as it was walking in front of him, and sat down on top of it. But the bundle of wood refused to go. The woodman got angry and began to strike it fiercely with his ax. But all in vain. The wood still refused to go.

Suddenly the heavens opened and a terrible voice cried out: "Man! You have been lazy and wicked, and instead of being carried by your bundle of wood you shall carry it yourself on your shoulders."

And from that time the human race lost its power, and no longer did everything move at its command.

THE LAND OF YOUTH

THERE was once a czar of Russia who fell ill of a disease which no doctor can cure, but an aged woman said to him:

"Oh, Little Father, when I was very young I heard of a land called the Land of Youth. In that land is a fountain of the water of life. Send one of your sons to get some of that water for you."

The Czar gave his eldest son, Prince Michael, a great sum of money and asked him to go in search of the Land of Youth.

Prince Michael departed, but the first place he reached was the City of Pleasure and he went no farther. Then the Czar sent his second son, Prince Peter; but Peter met his brother in the City of Pleasure and stayed there also.

Prince Vladimir, the youngest son of the Czar, then wanted to go, but the Czar feared that his two elder sons had perished and he did not want to lose his last child. Vladimir, however, grieved to see his father grow weaker and weaker, and one night he also secretly set out to get the water of life.

He passed by the City of Pleasure and entered a vast wilderness, which took him twenty days to cross, and came to a great sea. By the seashore he found an old, old woman, and he asked her the way to the Land of Youth.

"I am a thousand years old," she said, "and I have never heard of such a place. But perhaps my friends know."

She went down to the shore and blew upon a horn, and the water was churned into foam by the multitude of fishes that came to her call. No fish, however, knew of the Land of Youth. But as Vladimir was going away a whale came hurrying up.

"Can you take this handsome lad to the Land of Youth?" said the very old, old woman.

"Certainly," said the whale, "if he will wait till midnight. The Fairy of the Fountain and her two dragons will then be asleep."

So at midnight Prince Vladimir climbed on to the whale's back and was swiftly carried to the enchanted land. He stole to the fountain where the fairy slept beside her dragons, and filled two flasks with the magic water. But he saw the fairy's face and was so moved by her strange beauty that he resolved that when he had cured his father he would return and try to win her love. In order that she might know him he placed round her neck a chain of jewels with a locket inclosing his portrait.

Then he traveled back on the whale to the old, old woman, and gave her one of the flasks, and she drank the water and became a beautiful maiden. He then crossed the wilderness, and showed the other flask to his brothers in the City of Pleasure.

But Michael and Peter killed him and themselves took the flask to the Czar, saying that Vladimir had been slain.

Their father drank the water and became young again. He was so grateful that he proclaimed that Michael should rule over northern Russia, and Peter over southern Russia. But as he spoke two dragons came rushing through the air and killed the wicked brothers. On one dragon sat the fairy, on the other sat Vladimir.

Having fallen in love with Vladimir's portrait, the fairy had set out to find him. She discovered his body and restored it to life with the magic water. Then she told the Czar why she had killed his two elder sons, and led Vladimir back to the Land of Youth, where the two lovers still live together, ever young, ever loving and ever happy.

THE THREE MAID-SERVANTS

HEARING that a farmer's wife wanted a maid-servant, three girls came to her house seeking the work.

"Now," said her husband, "I will show you how to choose a good servant."

He placed a broom across the path leading to the farmhouse door, and he and his wife watched the girls as they came along.

The first girl kicked the broom aside, and the farmer said: "She's an idle lass and won't bend her back."

The second girl skipped over the broom. "She won't do," said the farmer. "She'll skip her work."

The third girl picked up the broom and put it in a corner out of the way, and the farmer said: "That's the girl for me: she is tidy, careful and hard-working."

So this girl was chosen.

MOTHER SHIPTON

IN the year 1488 a very strange little girl was born in a cottage by the Dropping Well at Knaresborough, in Yorkshire. She had a long, hooked nose and a turned-up chin, and her eyes were like the eyes of a wise old woman.

She was sent to school only once, and then she showed the schoolmistress that there was no need to teach her the alphabet; for she at once read off with the greatest ease the most learned books that could be found in the parish. But she did not show her very wonderful gifts until after she was married to Toby Shipton. Then one of her friends lost a new smock and petticoat, and came to her for help.

"Go to the market cross next market day at noon," said Mother Shipton, "and you will see what you will see."

Her friend did so, and at noon a woman came to the market cross with the smock and petticoat, and cried aloud:

"I stole my neighbor's smock and coat;
I am the thief, and here I show't."

And after making her confession in the sight of all the people, she gave back the things to the rightful owner.

The fame of Mother Shipton soon spread throughout England. She moved from Knaresborough to York, and Cardinal Wolsey sent the Duke of Suffolk to ask her to prophesy about him. And Mother Shipton said: "The Cardinal will see York, but he will never come to it."

"If he does come to York, he will burn you for false prophecy!" said the Duke.

Mother Shipton took her handkerchief and threw it into the fire, saying: "I will burn when that burns!"

And though the Duke of Suffolk stirred up the fire, and thrust the handkerchief right into it, the handkerchief would not burn.

Cardinal Wolsey then came to Cawwood, which is only eight miles from York, and climbed up the tower and looked at the city, and someone told him of Mother Shipton's prophecy.

"I will go to York at once and burn her for a false witch!" said the proud Cardinal.

But just as he was setting out for York he was arrested on a charge of high treason by King Henry, and he died as he was being taken to be tried in London. Mother Shipton lived to a great age, but many of the stories told of her are invented by modern writers.

THE NEXT STORIES ARE ON PAGE 2685.

Knaresborough, the home of Mother Shipton.

A pound of anything weighs more at the Poles than at the Equator, proving that the surface at the Poles is closer to the centre of the earth than is the surface at the Equator.

IS THE EARTH QUITE ROUND?

CONTINUED FROM 2487

WHILE we know that the earth is a ball, we also know that it is not quite a sphere, but is slightly flattened at the Poles. The shape is often described as like that of an orange, though this is an exaggeration, for the flattening is very slight indeed. If the earth were represented in exact proportions by a globe eighteen inches in diameter, the difference between the greatest and least diameters would be only about one-sixteenth of an inch. On such a globe the highest mountains, the Himalayas, would project only about one seventy-fifth of an inch. The earth is actually much smoother and rounder in proportion to its size than the balls in a bowling alley.

We know in several ways that the earth is flattened slightly at the Poles. In the first place, we know that the other heavenly bodies are of this shape and it is reasonable to suppose that our earth is no exception to the general rule. Then we know the earth was once in a fluid state, and has always revolved on its axis. It must of necessity have been slightly flattened at the Poles, for, in revolving, any ball that is not absolutely rigid will bulge midway between its poles.

Another proof of the flattened shape of the earth—or of its oblateness, as science calls it—is the fact that near the Poles the force of gravitation is found to increase. The reason for this is that the centre of the earth from which the force acts is nearer the surface at the Poles than it is at the Equator. The difference is only a little, but still it is great enough to be measured by ordinary scales.

Finally, the flatness is proved by actual measurement. If the earth were a perfect sphere, its circumference in any direction would measure the same. A circle is divided into 360 parts called degrees, and each degree on a perfect ball must be equal in length. When the degrees of latitude on the earth's surface are measured they are found to be longer as we get nearer the Poles. This can be the case only on a sphere that is flattened toward the poles. We know when we have traveled through one degree of latitude measured along a meridian of the earth, for such a distance causes a difference of one degree in the altitude of the Pole Star. These degrees of latitude are found, when actually measured, to vary considerably. At the Equator a degree is 68.70 miles; at latitude 20 it is 68.77 miles; at latitude 60, 69.21 miles; and at the Pole it is 69.39 miles. This is a conclusive and unanswerable proof that the earth is flattened toward the Poles.

WHAT WERE THE SEVEN WONDERS OF THE WORLD?

The Seven Wonders of the ancient world were: the Pyramids of Egypt; the Hanging Gardens of Babylon, a series of terraced gardens rising three hundred feet above the ground, said to have been built by Nebuchadnezzar to please his wife Amytis, who wearied of the plains of Babylon; the Temple of Diana at Ephesus; the Statue of Jupiter by Phidias at Olympia; the Colossus of Rhodes, a gigantic statue of bronze over one hundred feet high, and towering above the entrance to the harbor; the Mausoleum, or tomb of Mausolus, at Halicarnassus; and the Pharos of Alexandria.

The Pyramids. The Pyramids, the most famous of the ancient Seven Wonders, unlike the other Wonders, can be seen to-day. The astonishing thing about them is that, except for the passages and the tombs to which the passages lead, they are absolutely solid. The Great Pyramid of Khufu, or Cheops, is 451 feet high (originally 481 feet), while its base covers more than 13 acres. It contains 88 million cubic feet of masonry, weighing nearly seven million tons. About 2,300,000 blocks of stone were used to build it, each weighing two and a half tons. According to Herodotus a hundred thousand slaves were engaged for twenty years on this single structure. Apparently it was built solely for the honor and glory of Cheops, to provide him with a tomb. It is about 6,600 years old and was originally covered with limestone.

The Hanging Gardens. The ancient world considered the Hanging Gardens the greatest wonder of Babylon, the city of wonders. They consisted of about four acres of terraced gardens, standing on arches 75 feet to 300 feet high, and they were within the bounds of Nebuchadnezzar's palace grounds. Groves of trees were planted, arbors and banqueting halls were built on them, and they were filled with a profusion of the choicest flowers. To feed the gardens with water, Nebuchadnezzar had built at the top a reservoir which was fed by a screw from the Euphrates. According to one story, the Hanging Gardens were built to please a queen who came from a hilly country.

The Temple of Diana. The chief fame of the Temple of Diana of Ephesus now rests on Paul's references to it, but in ancient times it was famous throughout the civilized world. Very little is known about its beginning, but Crœsus, the rich king of Lydia, is said to have presented the Ephesians with the columns needed to build it, as well as with cows made of gold for its adornment. The temple contained a famous statue of Diana, which was said to have fallen from heaven and to have twice saved the city from destruction. The Goths destroyed both the city and the temple in A.D. 262. Excavations have shown that the temples once occupied 80,000 square feet of ground.

The Statue of Jupiter. The great statue of Jupiter which Phidias made for the temple at Olympia is believed to have been the sculptor's masterpiece, but its fate is unknown. The only trace of it to-day comes from a few small coins on which the statue is shown, Jupiter being seated on a richly sculptured throne. According to tradition, his body was made of ivory and his robe was of gold.

The Colossus of Rhodes. Considering its size and fame, the Colossus of Rhodes had a short and inglorious history. It was a gigantic bronze figure of Helios, the sun god, the work of a sculptor named Chares of Lindus, and was designed to form a huge landmark at the mouth of the harbor. After taking twelve years to complete, it was set up in 260 B.C. Sixty years later it was overthrown by an earthquake. For many centuries it lay in ruins, and was finally sold by the Saracens as scrap metal.

The Tomb of Mausolus. The splendid tomb of King Mausolus of Caria at Halicarnassus was the origin of the word mausoleum. It was built in the fourth century B.C., by Artemisia, widow of Mausolus, and was the most magnificent tomb then known. It was 111 feet in circumference and 140 feet high. Some of the sculptures are now in the British Museum. On its summit stood gigantic statues of Mausolus and his queen.

The Pharos of Alexandria. The lighthouse at Alexandria was built by Ptolemy I in the third century B.C. and stood on the island of Pharos at the entrance to the harbor. It was so famous that *pharos* came to be the Greek word for lighthouse. The building, said to be 400 feet high, was of white stone and contained many stories.

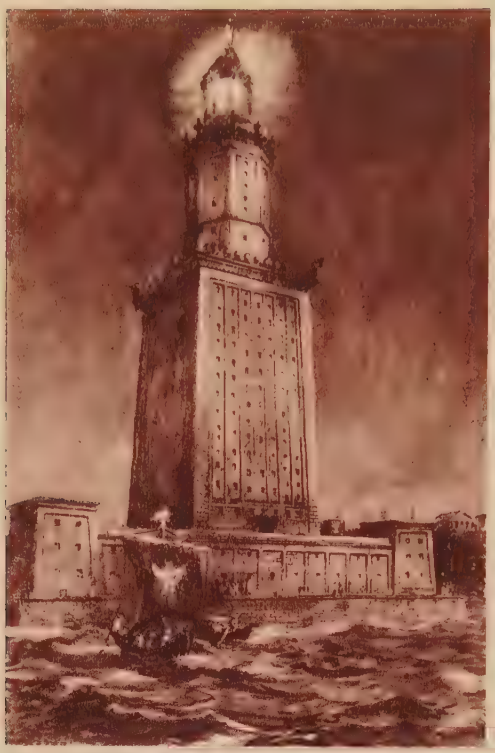
SEVEN WONDERS OF THE OLD WORLD

AS IMAGINED BY ARTISTS OF THE NEW

A RECONSTRUCTION OF THE TOMB OF KING MAUSOLUS OF CARIA AS IT STOOD AT HALICARNASSUS, IN ASIA MINOR, MORE THAN TWENTY-TWO CENTURIES AGO

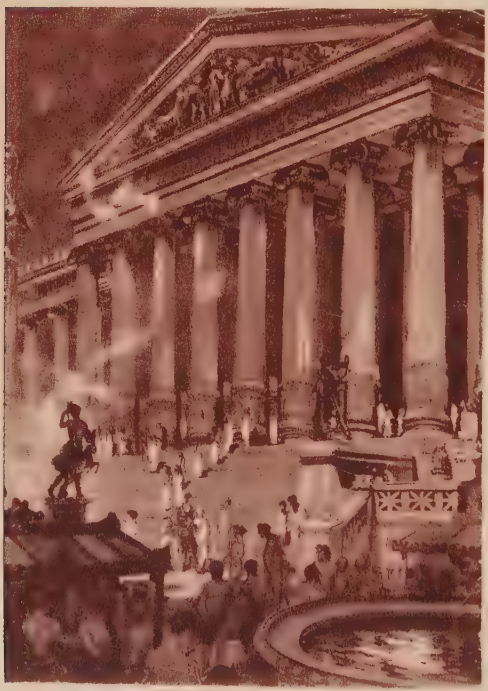
THE PYRAMID OF CHEOPS AS IT STANDS TO-DAY, A SILENT WITNESS TO SIXTY-SIX CENTURIES OF THE WORLD'S HISTORY. From a photograph by Donald McLeish.

THE COLOSSUS OF RHODES, THE GREAT BRONZE STATUE WHICH STOOD AT THE ENTRANCE TO RHODE'S HARBOR LOOKING OUT ON THE ÆGEAN SEA



PHAROS, THE GREAT LIGHTHOUSE
OF ALEXANDRIA

THE BEAUTIFUL HANGING GARDENS
OF BABYLON



THE WONDERFUL PILLARED FRONT OF THE
TEMPLE OF DIANA AT EPHESUS

THE HUGE STATUE OF JUPITER, BY PHIDIAS,
IN THE TEMPLE AT OLYMPIA

WHY IS THE SKIN OF THE NEGRO RACE BLACK?

Nobody knows the complete answer to a question like this, because the origin of the races of mankind is lost in ancient history. We know that we find black people living in the hottest parts of the earth, in many places where white men find it impossible to live. Evidently the black races have developed some power of resisting the climate and the diseases peculiar to that part of the world.

As a result of this it would come about that only those who were black could live and survive there. In course of time there would be nobody except black people in such places, a black race thus being produced by nature's selecting the blackest people as those best fitted to survive there. The blackness is probably the result of the continued exposure to the great heat of the sun in the tropical countries. Some people have thought that black was the original color of the human race and that the white races have arisen from them. Whatever is the reason, the color of the skin evidently results from certain powers of human beings to adapt themselves to the conditions of climate in which they live.

WHY DOES BOILING MILK FLOW OVER THE TOP OF THE SAUCEPAN?

When any liquid boils, parts of it are changed into a hot gas. This is much lighter than the liquid in which it is formed. It rises to the top as a bubble, and the bubble bursts, giving off the gas into the air. When a bubble formed at the bottom rises through the liquid unbroken until it reaches the top and bursts there, we say that the liquid is boiling.

In the case of water, which is all made of one thing, there is nothing to prevent the bubble from reaching the top of the boiling water and bursting there. So, though the surface is raised everywhere for a moment by bubbles which have half freed themselves, the water does not usually boil over. But milk is a mixture of many different things, some of which can boil and some cannot. What really boils in milk is the water, which makes up the greater part of it.

At least one of the things in the milk turns solid and forms a skin on the top of the heated milk. This skin is made of one of the valuable proteins of the milk, and it is great waste not to eat it. When the bubbles of water-gas reach the surface, they find themselves imprisoned by this skin and they lift it up, as hot air lifts a toy balloon. Then we say the milk boils over. If we stir it carefully, we may prevent this.

WHAT NEW WAY OF THINKING WAS STARTED BY AUGUSTE COMTE?

The remarkable Frenchman Auguste Comte was born in 1798 and died in 1857. He was responsible for the system of thought called Positivism. Comte believed that the only kind of real knowledge we have is our knowledge of things around us. He believed that men's thoughts showed three stages. In the first, they believed in gods or in God; in the second, they believed in all sorts of abstract words; and in the third stage, which he called the positive stage, men confined themselves to things about which they could have positive knowledge.

His religion included a great deal of regulation of human society and very careful education of the young. It is often called the "religion of humanity," because Comte believed that men should worship Humanity, the Great Being of which they are part. He invented a new calendar commemorating the names of great men of the past.

Positivism contains many beautiful and noble elements, but not in one case out of millions does it satisfy human nature. Though Positivists still exist in various parts of the world, they are extremely few in number, and the expectations of Comte have not been realized. Comte was, however, a genuine student of society, and he discovered various important truths about mankind, and said so many wise and deep things that his name cannot be forgotten.

DOES ELECTRICITY AFFECT THE GROWTH OF PLANTS?

It has been thought for some time that the passage of electricity from the air to the earth, which is probably always going on to some extent, must have an effect on the life of plants. Fields of various plants, including wheat, have been covered with electric wires so arranged that electricity passes from them into the earth. It has been proved that the increase in the amount of electricity that passes into the soil, or perhaps into the leaves of plants, is enormously valuable. The plants seem to grow more quickly and strongly. It is possible that some day electrical equipment will be part of the usual machinery of a farm.

WHY DO ALL MARRIED WOMEN WEAR WEDDING RINGS?

Most of the people who study the customs of long ago agree that the wedding ring was used first in the days when men used to own their wives. In those terrible times, which stupid people call the "good old days," men used their brutal strength to make women their slaves. It is customary to put a chain on a slave to show that he has an owner. After a time, as men became a little better, instead of actually putting anything like chains on their wives, or rings round the neck or body, they invented something which would have the same meaning without being really bad. Anything that stands for something else, like this, is called a symbol. We now believe that the wedding ring began as a symbol, meaning that the wife was the husband's property.

WHERE DOES A COLD COME FROM AND WHERE DOES IT GO?

A cold is due to microbes that attack our noses and throats, and in bad colds even our upper air-passages. The microbes probably come from someone else who has a cold. We do not know whether the cold-microbe lives anywhere except in the throats and noses of human beings. If it does, perhaps a cold may come from wherever it is the microbe lives. Usually the answer to the first half of the question is that the cold comes from someone else. Unfortunately, it is none the better for having given it to you. The answer to the second half of the question is that the cold ends because, after a few days, our bodies learn how to deal with the microbes. They are either killed, or else can do us no more harm, and so we recover. But the cold may often go to other people, just as it came to us. Thus the trouble spreads.

WHY DO WE GET OUT OF BREATH WHEN WE RUN?

We know that if we treat the heart properly it never gets tired; but if we run very hard we suddenly throw a great deal of extra work on the heart. So long as we are well one of the most wonderful things about the heart is the amount of reserve power it is able to call up. When we get out of breath we have already called up this reserve power and should take warning. Boys at school sometimes make their hearts unwell for many months by running too hard in races. When we run we use up a lot of air, as an engine-driver uses much air in his furnace if he makes his train go quickly. Running makes the blood rush very quickly through our lungs, where it helps itself to the oxygen in the air which we breathe. The heart beats more quickly, and at last it sends a message to the brain and makes us out of breath, as a warning. If we are wise we take the warning and slow down or stop altogether.

IS THE INSIDE OF THE EARTH A VAST HOLLOW?

Though no one has ever seen the inside of the earth, we are certain that the answer to this question is no. We know that the earth has a solid crust, very thin, and apt to crack and buckle, producing such things as mountain chains. We can prove that this crust must be utterly different from what lies underneath it.

Scientists know how to find out the weight of the earth. This weight they compare with the size of the earth. It is found that the material just under the crust is denser than the material in the crust itself.

The nearer to the centre of the earth, the tighter is packed together the material of which the earth is made. So the inside of the earth, instead of being hollow, is really heavier than the outside layer. Scientists also say that the material under the earth's surface is very closely pressed together.

WHY DO BATS HIDE THEMSELVES WHEN THE SUN SHINES?

Bats are what we call nocturnal creatures. They sleep during the day and are active at night. So are many other animals. Nearly all the wild deer are, and the lions and tigers and leopards. These larger creatures can see by day, but the bats cannot. They are as blind in the sunlight as dormice. Therefore, as they would be helpless if a cat or a big bird were to see them by day, they hide away in dark places. In all the church towers, in corners and underground passages, in little openings under the roofs of houses—there the bats hang by day. There is an enormous cave in Kentucky in which millions of bats are to be found, sheltering while the sun is shining. They cling to the rock and to each other in such thick clusters that forty bats were once counted in a space of a few inches. The Pyramids swarm with bats. Inside all is dark as the darkest night, even on

the brightest day, and travelers are astonished to find bats dashing about their heads.

WHY ARE THE SPOKES OF A MANGLE WHEEL CURVED?

We frequently see in machinery wheels with curved spokes, and the mangle is one of the most familiar things with wheels made this way. One might think at first that the spokes are curved merely to improve the appearance of the machine; but, as a matter of fact, they play quite an important part when the wheel is being cast. Metal always contracts on cooling, so that both wheel and spokes are liable to crack after casting. But it has been found that by making the spokes curved the wheel is much less likely to come to harm. This is because curved spokes allow the rim of the wheel to contract more readily when the metal cools.

HOW CAN A PLANT GROW ON A BARE WALL?

One of the most important parts of the food of green plants is found in the air. That is the carbon dioxid which provides the plant with its carbon. But that is not all. The plant must have water and it must have salts. When we examine a bare wall we find that it is not so bare as it seems at a passing glance. In the first place, rain falls on it, and so the plant on the wall gets its water. Nor is this all. Rain itself contains small quantities of salts which are valuable to the plant. As it trickles down the wall it gains more. It has the power of melting out of the wall, for instance, salts that may be contained in the mortar. We know that lime is very valuable for plants, and mortar is really a kind of lime. So we find that plants can obtain, even on a bare wall, those things that are necessary for their life. But the supplies of certain essentials are very scanty, and the forms of plant life which can grow in this fashion never reach a large size.

WHERE DO THE STONES WE SEE LYING ABOUT COME FROM?

Stones are really pieces of broken rock. By the side of the road you can see stones being made with a hammer. These are sharp, as they have been rudely broken.

But rocks are broken up in many other ways. Even the life in the soil on a cliff, for instance, may gradually break up the surface of the rock. If the broken pieces rub against each other and are open to the wind and the rain, they get rounded and dull. But if we take many of these stones and break them we find inside the unchanged rock, often beautifully smooth and bright. Those we have been speaking of are made of real rock which ages ago was made under the action of great heat. There are other kinds of stones which are quite soft. We may pick up sometimes a soft stone which we can easily rub away—a piece of soft sandstone, which is really much the same as the sand on the seashore.

WHY DOES A NOISE OCCASIONALLY BREAK A WINDOW?

A noise is an irregular wave in the air. A wave of air may break a window exactly as a wave in the sea breaks a wall. If you think a minute, you will see that every time a noise passes through a shut window it shakes the window. If the noise is coming in from the street, the air outside is thrown into waves which pass through it until they strike the window and shake it. The window shakes the air inside the room in the same way as the air outside shook it, only perhaps not so strongly. And so the noise reaches you, just as if you had heard it outside, but not so loud. Plainly, the noise has only to be loud enough—that is to say, the waves in the air have only to be big enough—to shake the window more than it can stand. Then it breaks.

WHY DOES A FLYING BIRD NOT FALL TO THE GROUND?

We know that there is such a thing as the air, a great ocean as real as the ocean of water; and the flying of a bird is really like the swimming of a fish. But if a bird stops flying, it will drop, for its body is heavier than the air. Though the bird's body is heavier than the air, it is most beautifully made so as to be as light as possible; and there are spaces in its body which are filled with air.

Though this helps the bird, of course, its body is still heavier than the air, and it will fall unless it uses its wings. The bird knows this and sometimes it wants to fall quickly. It folds its wings and simply drops. The strongest muscles in the bird's body are those which press the wing downward. If it uses these muscles quickly enough, it keeps its body up or even raises it. When we swim we do what is really the same thing, though swimming is not nearly such hard work as flying. No machine that man has ever made is as clever as a bird for flying.

There is no machine in the world that can do so much work as a muscle in proportion to its weight.

WHAT IS PEAT AND HOW IS IT MADE?

Peat is halfway between trees and coal. It is made from decayed vegetable matter, and we find it in layers many feet thick. About one-seventh of the whole surface of Ireland is occupied by bogs in which the formation of peat has occurred or is occurring. It is said that an inch or two of peat forms every year. On the average, about three-fifths of peat consists of carbon. When first dug, it is very wet, and it has to be thoroughly dried out before it can be used for fuel.

WHY DO WE JUMP WHEN WE GET A SHOCK?

The jump when we get a shock, or the closing of our eyelids when something comes near to them, is called a *reflex action.* Reflex actions are constantly occurring in our bodies, and in those of all living creatures, and we could not live without them. They are called reflex because the action follows at once on the thing that excites it, almost as if it were a ball reflected (thrown back) from a wall. The mark of a reflex action is that the *will* is not concerned in it. That is the whole point of this question. We do not want to jump. We do not make up our mind to jump. But we jump first, and then notice that we have jumped. The will does not cause reflex actions, but it can often control them if it has time and warning given to it. That is why we jump at an unexpected sound, as when someone bangs a door; but an expected sound does not affect us.

WHY DO THINGS SEEM BLURRED WHEN SEEN FROM A GREAT HEIGHT?

We can only suggest an interesting theory about this. Ordinarily, anything we look down to see is quite close to our eyes—a few inches when we are reading, or a few feet when we look at the ground. It is the rule that when we look at anything near, our two eyes turn inward toward each other slightly, or converge, as we say. The eyes are accustomed to converging when they look downward. As the things they look down on are usually near, and as the two eyes cannot see a near thing well unless they converge slightly in looking at it, they do the same when we are on a height and the nearest thing is perhaps the ground.

In order to see a thing so far away, our eyes should look straight out, parallel with each other. Until we have learned how to look out from high places the eyes converge and so are bound to give us a blurred view of the ground. We feel that we cannot see properly and become frightened and giddy. This is what some students of the eyes believe.

WHAT ARE THE WIRE HOOKS ON THE CROSSBARS OF TELEGRAPH POLES?

It sometimes happens that a telegraph wire becomes detached from the little earthenware insulator which carries it. The wire hooks we see at the ends of the crossbars are to prevent the wire from falling on to the road when this occurs. Not every telegraph pole has these little hooks, but they are usually seen on the poles placed in exposed positions, especially on those where the line takes a sharp turn. In this way not only are the telegraph authorities spared much trouble and expense in the event of a breakdown but passers-by are saved from accident.

HOW DO GARDEN CITIES DIFFER FROM OTHER CITIES?

Wise people, instead of trying to abolish cities, are beginning to build cities of a new kind, which are called garden cities. Some day, no doubt, all cities will be of this kind. Every house in a garden city stands free of its neighbors and has its own garden. The roads are wide and well provided with trees. The rich green leaves help to purify the air, and the people are not so overcrowded as to make the air foul. Dense smoke is not allowed to come out of chimneys. There are many ways of consuming smoke and making it useful instead of dangerous. No one is allowed to buy a piece of land and cover it with slums. In North America and in the British Isles people have been very much pleased with this new plan for building cities. There is less disease, and fewer babies die in these garden cities than in other ordinary cities. Better health brings more happiness, and wise people are finding it in the new cities.

WHAT DO WE MEAN BY CARRYING COALS TO NEWCASTLE?

"To carry coals to Newcastle" means to do something unnecessary. Newcastle, a city in the coal district of England, ships coal all over the world. Coal sent there from another country would not sell.

THE NEXT WONDER QUESTIONS ARE ON PAGE 2715.

Cutting watercress for the market on a watercress farm.

THE USEFUL VEGETABLES

CONTINUED FROM 2536

MOST of the fruits we eat are actually the seed-vessels of plants, while the nuts are in most cases the seeds themselves. We also use the seeds and seed-vessels of many other plants for food, and some of these we may look at now.

First of all there are what we call the leguminous plants—peas, beans and lentils—in which the seeds are contained in a *legume*—an oblong pod consisting of two valves. These are very valuable plants, both for food and because they give nitrogen to the soil.

Peas are a very ancient food. It is said that signs of their cultivation exist in the lake-dwellings of Switzerland and Savoy. Men of science believe that the Mediterranean region, where wild peas still flourish, is the original home of the pea. At any rate, it has been carried to all parts of the temperate regions. Endless varieties have, of course, been developed by plant-breeding, and enormous quantities are grown in field and garden. They divide themselves naturally into ten classes which are sometimes spoken of as different species, though they may really be one.

The common, or garden, pea, a climbing annual, has two or more white flowers on each flower-stalk, and the fruits, or peas, that come from these are more or less round in form. Some varieties of the plant are short, but others grow as high as eight feet and need supports up which to climb.

The field pea has only one flower on each flower-stalk, and the blossom is always purplish red. The seeds, or peas, are more numerous than in the case of the garden pea, and, as they are very closely packed in the pod, develop an angular shape. The field pea is used both for cattle fodder and for human food. The stalk of the field pea is also much used for cattle food, and when cut green and dried it is more nutritious than hay. It seems curious that such a valuable food plant as the pea was not cultivated in England before the time of Elizabeth. The sweet pea of the garden is a variety developed for the sake of its blossoms alone.

Not less valuable as a food is the bean in all its varieties. Of some, like haricot and butter beans, we eat the seeds themselves; while of others we eat the green pod, or seed-case, with the unripened seeds inside. Like the pea, the bean grows sometimes in bush form and sometimes as a climbing plant needing support. It is probable that all varieties are sprung from a common ancestor, which was, it is thought, a native of South America.

It was during the hard times of the Civil War in the United States that

the bean began to be grown on a large scale as a field crop in the United States. It supplied the soldiers with a nourishing and easily carried food. Since that time America has never lost her love for the bean, and thousands of millions are canned every year with pork and tomato sauce and sold under the very misleading name of baked beans. During the World War the supply of baked beans to United States and Canadian troops in Europe led to a far more general adoption of this nourishing food by Europeans.

THE VALUABLE NEW FOOD THAT HAS COME FROM THE EAST

It is the fact that beans are one-fourth muscle-forming food that makes them so valuable in the diet of man and beast. There are many other kinds of beans grown, and many varieties are to be found in gardens and markets.

A bean which has increased enormously in importance of recent years is the soya bean of Japan and China. This is really more like a pea than a bean. Its value had long been known in the East, but only after the war did it attract the attention of European and American scientists. Now it is regarded as one of the most valuable food plants in the world. It provides an ideal diet for man as well as for animals. The soya bean contains forty per cent of albumin and twenty per cent of fat, and it can be produced more cheaply than any other food. An enormous industry has grown up in Manchuria in producing soya beans for all sorts of purposes. The oil is much used in the manufacture of oleomargarine. An artificial milk is also made from the soya bean, which bears a close resemblance to natural cow's milk in both appearance and flavor.

THE BEAN THAT SHOULD HAVE A PLACE OF HONOR AMONG FOOD PLANTS

The cow-pea, a native of tropical Asia and Africa, is very much like the soya bean. It is now cultivated largely in the warmer temperate climates, and is a very important crop in the United States. The pods are sometimes more than a foot long, and can be eaten like scarlet runners when green. The seeds are also eaten dry.

The lentil, cultivated by man as far back as the Bronze Age and often referred to in the Bible, is a native of Mediterranean countries, from which it has spread to many other parts of the world. It has always been a favorite food in Roman Catholic countries, where the number of fast days, on which the eating of meat is forbidden, has caused this valuable vegetable food to be highly prized.

It is a small climbing plant with weak stalks about a foot and a half high. The leaves are winged, and each is terminated by a tendril. The pale purple flowers are succeeded by short flat pods containing two or three flat round seeds. Though in America lentils are rarely grown, the seeds are familiar to us, as they are often used in soups. In southern Europe and in the East the lentil has more than once saved people from starvation in times of scarcity. It should therefore have a place of honor among the food plants of the world.

There is still another member of the Pea and Bean Family which is very interesting on account of the way it ripens its fruits. This is the plant known variously as the peanut, groundnut and earthnut. In Great Britain it is more often called the monkey-nut. The fruits sold as nuts are not really nuts at all. They are the seed-vessels, or legumes—quite the same thing, botanically, as the pea or bean pod—and they have a very strange way of behaving when growing.

THE CUCUMBER GROWN IN CHINA FOR THIRTY CENTURIES

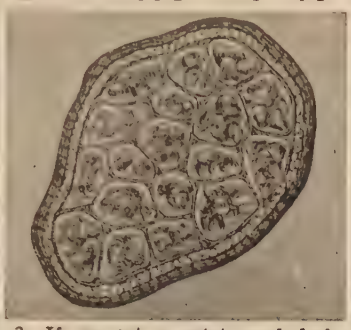
The pods are formed in the air, like the pods of beans, but as they grow, their stalks take a strange turn. The pointed tips enter the ground and work their way under the soil, and the pods eventually come to maturity about four inches below the surface. This plant, grown extensively in the southern states of America, is of the greatest value. It provides a highly nourishing food for man and hogs, and when the plant is plowed into the ground it greatly enriches the soil, like other members of the Leguminous Family.

Among the plants whose seed-cases we eat, the tomato now holds an important place, though half a century ago it was little known. It was then called the "love-apple." Grown as a curiosity in a few gardens, no one thought of eating the small red fruits until plant-breeders, by careful selection, produced the rich and luscious fruits we know to-day.

Another familiar seed-case that we eat is the cucumber. This plant is a member of the Gourd Family, to which belong also the vegetable marrow, melon, pumpkin and squash. The cucumber is a native

THE LIFE-STORY OF A POTATO

1. If we look at a potato we see on it a number of depressions called eyes. These are really buds, and the potato is not a root or bulb, but a stem that has developed underground. Botanists call it a tuber.



2. If we cut a potato and look through a microscope, we see cells packed with tiny grains of starch, stored up for the buds when they sprout. A few magnified cells are shown here, but a large potato contains millions.

3. When the time for sprouting comes, the starch is changed into sugar, and the buds, or eyes, feed upon this till they sprout. If the potato is planted in the soil some sprouts will appear above ground.

4. As the shoots grow they develop into different kinds of stems. Those above ground become green and bear leaves.

5. Other stems grow underground and throw out little branches, the ends of which swell, and thus the tubers are formed.

6. This is the blossom of the potato plant, which is a relative of the deadly nightshade. The flowers are white or lavender-tinted.

7. Here is a complete potato plant with the underground stems bearing roots, the tubers, some of which are forced to grow curious shapes because stones are in the way; and the green stems that grow above the ground. If the plant is let alone, flowers may be borne and seeds produced.

8. Here is the potato fruit. It is a ball with many seeds. When potatoes are grown from seeds new varieties sometimes arise.

of the East Indies, and has been cultivated in China for at least three thousand years. It grows on a vine, bears prolifically, and needs plenty of sun and air. It is very sensitive to cold, and in northern climates is generally grown in a greenhouse. The gherkin is a species of small cucumber used for pickling. The name is sometimes loosely used for any small cucumber.

The vegetable marrow, another member of this family of plants, is familiar in England, but in America pumpkins and squashes are far more popular. Many people who try to grow marrows in their gardens are surprised that after having a fine show of blossom they get few marrows. The reason is that the flowers often need artificial pollination, and if this is omitted, the blossom dies without producing fruit.

THE STICK OF CELERY THAT GREW TO BE HIGHER THAN A MAN

There are many plants whose stems we eat, such as rhubarb, asparagus, celery, and so on. Rhubarb is generally spoken of as a vegetable and in early spring, before our favorite fruits appear, rhubarb leaf-stalks, cut into pieces, form an excellent substitute for fruit. Enormous quantities are grown in America for use in tarts and pies, and in England much is made into jam. Rhubarb was cultivated in England as far back as 1778.

Celery is a remarkable example of what man can do by cultivation. The wild celery is a native of Great Britain, where it is found growing by brooks and ditches, especially near the sea. In its wild state the plant has a coarse, rank and unpleasant taste. By careful cultivation, and by earthing up the stalks to keep out the light and blanch them, man has produced a beautiful large white celery, crisp and nutritious, and bearing little resemblance to its wild relative. Some varieties are self-blanching. A head of celery once weighed nine pounds and measured ten and a half feet in height. It was firm and crisp, and so far from being coarse was of an excellent flavor.

THE KINGS OF PERSIA WERE EATING LETTUCE BEFORE CHRIST WAS BORN

The asparagus is a member of the Lily Family, as indicated by its tiny bell-shaped flowers. It grows wild on the seashores of Britain, but has been improved by cultivation out of all resemblance to its ancestor. The fleshy root is perennial, living year after year, and it throws up fresh stalks from eyes rather like the eyes of a potato. The stems rise up in the early part of the spring, and are cut when a few inches above the ground. A well-made and well-kept asparagus bed will continue in a good bearing condition for more than twenty years.

The leaves of many plants are used for food, including those to which we give the general name of greens. Lettuce is one of these. Hundreds of years before Jesus was born the kings of Persia were served with salads made up largely of lettuce leaves. The plant has now spread to all European countries, and has been brought to America. It is the chief salad plant to-day. It is a member of the Thistle Family, and its name lettuce is derived from the Latin word for milk, a reference to the milky juice the plant exudes when pressed. It has narcotic qualities, and a lettuce salad is very good for anyone with tired nerves.

Another member of the Thistle Family whose leaves are eaten, a near relative of the chicory, is endive. Watercress and garden cress are members of the Mustard Family, and another member is the sea-kale. This is found growing by the seashore right down to the line reached by the tide. When the cold weather comes, the tops die down, and sand and gravel are heaped on top of the stems to protect the kale. In spring new shoots come up. Sea-kale is also grown in gardens from seed and root-cuttings. It is forced in winter in dark sheds and pits heated with manure or hot-water pipes.

HOW MEN USED THE WAY OF A PLANT TO INCREASE ITS VARIETY

Several members of the Cabbage Family provide vegetables for the table and now show little resemblance to their wild ancestors. In days long gone some wild cabbage plants showed a tendency to form little heads at the axils of their leaves. Wise men noticed this peculiarity and encouraged the plants to go on developing in this direction. The seeds of those that showed the tendency most were saved, and the selection went on and on, until now we have the Brussels sprouts, so called because the best seeds came from Brussels. In this plant small cabbages grow all round the stalk.

Other cabbage plants showed a tendency to form fleshy subdivisions of the flower-stems. By selecting the seed of these again and again men have produced

PICTURE-HISTORY OF A POTATO ENEMY

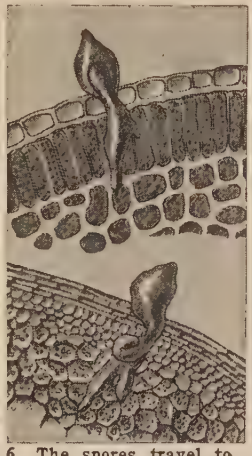
1. The potato disease, which led to a terrible famine in Ireland in 1846 and 1847, is caused by a fungus, and these pictures show its life-story. Brown patches appear on the upper side of the potato leaf.

2. Here we see the fungus on the leaf greatly magnified, with capsules forming at the ends.

3. This shows how the fungus, after eating its way into the leaf, emerges through the stomata.

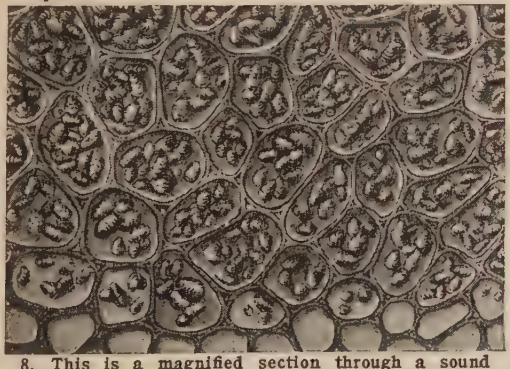
4. Here is a section through a diseased potato leaf showing the fungus eating its way among the cells. The capsules can be seen.

5. The capsules break up into separate portions called zoogonidia, which burst the outer wall, escape, and develop cilia with which to move.

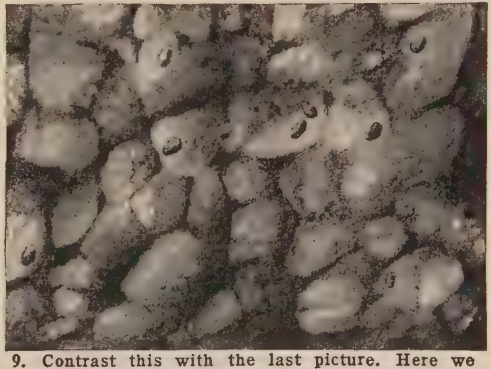


6. The spores travel to other potato plants, some entering the leaves as shown magnified at the top, and others being washed into the soil.

7. Here we see a longitudinal section through the tuber of a potato that has been badly attacked by the fungus disease; the tuber is ruined.



8. This is a magnified section through a sound potato, and, as can be seen, the cells of the tuber are in excellent condition since each is filled with healthy starch grains.



9. Contrast this with the last picture. Here we see a magnified section of a diseased potato with the cells blackened. The starch grains have been almost completely destroyed.

the white coral-like cauliflower. The Italians were very skillful in producing this type of cabbage, and as their name for it was *broccoli*, that name came to be used for a kind of cauliflower that they developed. This is a particularly hardy kind. *Broccoli* means "little sprouts."

Then, again, it seems that someone in early days noticed that certain wild cabbage plants had very swollen stems, and from these they developed the kohl-rabi, which is really a cabbage with the stem swollen out close to the ground and presenting the appearance of a large turnip growing above ground. Other cabbages were found to have unusually large terminal heads, and from these were produced many varieties, such as the big smooth-leaved drumhead cabbages and the crinkled savoys. Another cabbage is the borecole, or curly kale, in which the leaves are beautifully cut and curled. The color is purplish green, variegated with red, green and yellow. In this kind the leaves never close up to form a head, as in the savoy. Certainly the cabbage provides an interesting example of the wonderful variety of foods that can be produced by the scientific development of the same plant in many different directions.

THE CABBAGES AND POTATOES THAT MATTER SO MUCH TO US ALL

Parsley is a member of a very big family which includes such different plants as sea-holly, hemlock, caraway, coriander, sweet cicely and angelica. It grows wild, but cultivated varieties find a place in most kitchen-gardens. Spinach is a member of the Goosefoot Family, and has for its near relatives beets and mangel-wurzel, but in this case we eat, not the root, but the leaves. Among its wild relatives in the United States are Good-King-Henry, pigweed, marsh-samphire, saltwort and glasswort.

We now come to the plants whose underground stems called tubers we eat, and these include some of our most valuable and important food plants outside the cereals. First and foremost there is the potato. Although this tuber was unknown in Europe three and a half centuries ago, it is difficult to conceive of life to-day without potatoes. These now are a staple vegetable in almost every country, and in Ireland for a long time they formed the main food of the people. The failure of the crop once brought tragedy. When the terrible blight, or fungus disease, attacked the potatoes there in 1845 and 1846, the country was quickly brought to a state of starvation, and men realized how dependent on the potato as a staple food they had become.

It seems strange that so valuable a food plant should have as a near relative one of the most deadly of poisonous wild plants, the deadly nightshade. Yet such is the case, and indeed most of the members of the family to which the potato belongs are of a poisonous or narcotic character. One of these is the tobacco plant, and another is the Jamestown, or jimson, weed. However, the tomato and the eggplant also belong to this family.

WHAT SIR WALTER RALEIGH HAD TO DO WITH THE POTATO

The potato is a native of the American continent, and long before the Spaniards went to the New World it had been cultivated by the Indians in Peru and by other tribes. The first potatoes to reach Europe were brought over by the Spaniards from the neighborhood of Quito. From Spain the plant seems to have spread to other parts of the continent. At first it was grown only as a curiosity and not as a food plant. The popular idea that Sir Walter Raleigh first brought the potato to England from Virginia is not true. Sir John Hawkins seems to have introduced the first potatoes in 1563, and twenty-one years later Sir Francis Drake again introduced them. A statue to Drake as the introducer of the potato to Europe was erected at Offenburg, in the duchy of Baden, in the middle of the nineteenth century, and still stands there.

What Sir Walter Raleigh did was to grow potatoes regularly for the first time in both England and Ireland. At the time nothing came of this. In fact, so little was the tuber appreciated as a food plant that, even in an exhaustive and famous work on gardening published so late as 1719, there is no mention of the potato. The Royal Society, however, had, half a century before, taken the matter up, and encouraged the growing of the potato as food in Ireland as a provision against famines which were threatened in that country.

THE THOUSAND MEMBERS OF THE GREAT POTATO FAMILY

It was on this account that from early times the potato was grown more extensively in Ireland than in England. Its

THE BIG GROUP OF FOOD PLANTS

DRUMHEAD CABBAGE

CULTIVATED CABBAGE

SAVOY

CURLY KALE

WILD CABBAGE

BRUSSELS SPROUTS

KOHL-RABI

CAULIFLOWER

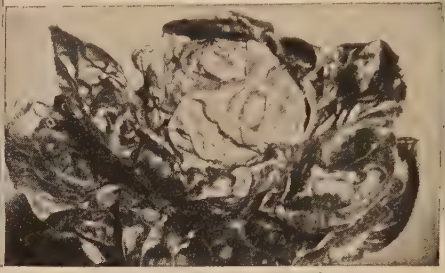
BROCCOLI

Here we see some of the members of the wild cabbage's wonderful family. The centre picture shows the ordinary wild cabbage, an insignificant and unattractive plant from which have been developed by selection and careful cultivation all these varied and useful vegetables, which look very unlike their parent.

WHAT CAREFUL SELECTION CAN DO

BROAD BEAN

GREEN STRIPED MARROW



HEAD OF LETTUCE

PEAS

RADISHES

GLOBE ARTICHOKE

LONG WHITE MARROW

CELERY

ASPARAGUS

CARROTS

We owe the production of such fine specimens as these to the skill of the plant cultivator, who is ever on the lookout for new and useful points, and develops these until they become of real value to man.

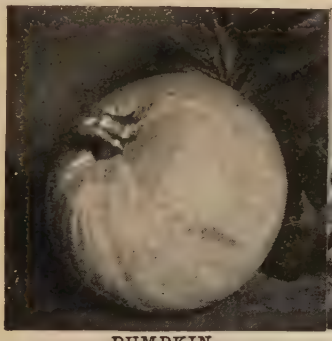
VALUABLE PLANTS FROM WILD ANCESTORS

SCARLET RUNNER BEANS

PARSLEY

TURNIPS

STRING BEANS



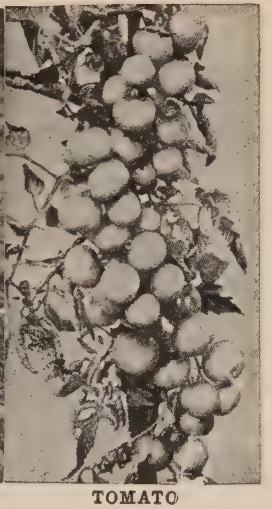
PUMPKIN

JERUSALEM ARTICHOKE

A POTATO

PEANUT

ROUND-SHAPED VEGETABLE MARROW



TOMATO

Impossible as it may seem, all these splendid varieties of foods have been developed from wild ancestors, which in many cases show few of the useful characteristics exhibited by their aristocratic descendants.

GROWING FOOD FOR LONDON

ACRES OF WATERCRESS BEDS GROWING WITHIN A FEW MILES OF LONDON

A FINE SHOW OF CUCUMBERS IN AN ENGLISH GREENHOUSE

A GOOD CROP OF ONIONS WAITING TO BE GATHERED

The inset at the top shows the watercress plants in detail at a later stage, when they are in flower.
Photos, Messrs. L. W. Brownell, Barr & Sons, Carter & Co., and Sutton & Sons.

introduction as a food plant into Europe may be regarded as one of the great epoch-making events of agricultural history. In many nations it has exercised a beneficial influence on the health of the people, and it has greatly increased national wealth and welfare. In France the potato was not grown for food before 1778, when Parmentier showed Louis XVI a display of plants in bloom. The king, however, was less interested in the potatoes themselves than in the flowers which so pleased him that he picked one and stuck it in his buttonhole!

At the same time it must be remembered that the potato is not nearly so nutritious as the great cereals, and its constant use as the principal food has a bad effect on the physical character of the people using it. While a piece of ground which will yield thirty pounds of wheat will produce a thousand pounds of potatoes in the same time, a hundred parts of wheat-flour contain as much real nourishment as 613 parts of potato.

SOYA BEAN YAM COW-PEA

These three plants which are natives of the Far East, but have been carried to other parts of the world, are extremely valuable. The soya bean, which is grown in large quantities in Manchuria is the centre of a great industry there. Both the others are widely grown, and we sometimes forget that they are not American.

The wild potato which Darwin saw growing abundantly during his voyage in the Beagle has very few and very small tubers, but man has produced by selection and plant-breeding some very fine varieties, and the yield from these is often enormous. At least a thousand different kinds of potatoes must have been produced by long cultivation.

The potatoes we eat are not roots, but are called tubers, and they are really thickened underground stems. The eyes are leaf-buds which, if left in the ground, prolong themselves into leafy stems. The purpose of these thickened stems, or tubers, is to store up reserve food for the plant. The plant, as we see it above ground, dies at the end of the season, but the tuber grows in the following spring like the root of a biennial plant. The potatoes are not grown from seed, but from these tubers. The farmer plants either little potatoes whole or pieces containing an eye. Each piece produces a plant. Many varieties of potato have now abandoned the habit of flowering and rely wholly upon tubers to continue their race.

Plant-breeders, however, sometimes grow potato plants from seed in the hope of producing new varieties with some peculiar qualities that will render them more valuable. Once in every hundred or hundred and fifty trials, perhaps, the breeder finds a plant that is worth something, and in this way many valuable new varieties of potato have been produced.

Like many of the other members of the Nightshade Family, the potato has a bitter and poisonous sap in its stems and leaves; and if a tuber is exposed to the sun, it turns green and acquires a bitter taste, and is then dangerous to eat.

In recent years the manufacture of starch and alcohol from potatoes has

become a great industry, and perhaps one day we shall all be running our motor cars on alcohol obtained from the potato.

In the United States sweet-potatoes and yams are extensively used as well as white potatoes.

THE SWEET-POTATO ROOT IN JAVA THAT WEIGHED FIFTY POUNDS

Like the morning-glory, the common bindweed of our fields and hedgerows, the sweet-potato grows as a creeping vine, and it has the coiling stems, the heart-shaped leaves and the trumpet-shaped flowers common to the Convolvulus Family. In this case the flowers are pale purple. In contrast to the white potato, the sweet-potato is a fleshy root. We know how persistent the common bindweed is if it gets into a garden, and how, when it is dug out, any small fragments of root left behind in the ground sprout and grow into fresh plants. The sweet-potato is very similar. Plant a piece of root, and a shoot rises to form a new plant. The root grows to an enormous size, and in Java has been found to weigh as much as fifty pounds. In America, however, the average root weighs much less. The sweet-potato is propagated by slips grown from the roots.

Another plant similar to the sweet-potato, though belonging to another family altogether, is the yam, which is much eaten in the tropical East and in Africa and the West Indies.

Among other plants of which we eat the roots is the radish, found in two main varieties—the long-rooted, shaped like a carrot, and the turnip-rooted, shaped like a turnip. The radish, which is a member of the Cabbage Family, has been cultivated from time immemorial in the Far East. It came by way of Europe.

THE JERUSALEM ARTICHOKE THAT HAS NOTHING TO DO WITH JERUSALEM

Another root food is the carrot, a member of the Parsley Family, and many kinds varying greatly in shape, size and color have been produced by plant-breeders. In Germany carrots are often dried, roasted and ground up as a substitute for coffee. In England they were first cultivated at Sandwich in Kent. Another member of the Parsley Family whose roots we eat is the parsnip. Though many do not like its flavor, it is more nutritious than the carrot.

The Jerusalem artichoke, which is not related to the globe artichoke but is really a sunflower, is cultivated for its roots, which, when boiled, taste something like the ordinary potato, though they contain less starch and more sugar. It is very productive, more easily grown, and more cheaply harvested than the potato, and it is a wonder the plant is not more used. A crop is raised by planting cuttings of the root, each with an eye for sprouting. The plant obtained its name in a curious way. It has nothing to do with Jerusalem and is not an artichoke. The word "Jerusalem" is simply a corruption of the Italian *girasole,* meaning "sunflower"; and the name "artichoke" was given because of a supposed resemblance of flavor in the eatable part to the globe artichoke.

The turnip has been described as first cousin to the cabbage. It is another member of the great family which provides us with so many vegetables. The part we eat is a combination of root and stem.

THE ANCIENT ONION THAT HAS SPREAD ALL OVER THE WORLD

The beet-root, as we read on page 3418, is one of our great sources of sugar, but a variety known as the red beet is grown in gardens as a vegetable. This plant is a member of the Goosefoot Family. The horseradish is a member of the Cabbage Family, and its rhizome, or woody root-stock, is greatly appreciated as an aid to appetite with roast beef. Once horseradish gets into a garden it is very difficult to displace, for the smallest fragment of the rootstock will soon spread and multiply. When digging up horseradish for table use we should be extremely careful to know that we have the right root, for several cases of poisoning are on record where ignorant people have taken the dangerous roots of the monk's-hood or aconite in mistake for horseradish.

The chicory plant, a cultivated variety of the common succory, is grown extensively for its root, which is dried, roasted and ground up for use with coffee.

The onion is not a root, but a bulb—a short stem growing near or under the ground with many overlapping, fleshy scale-like leaves. It is a member of the Lily Family, and is believed to be a native of India; but it was cultivated in Egypt nearly four thousand years ago, and traveled from there to Greece and Italy, finally spreading all over Europe. It is very nourishing, and is an exceedingly important food plant.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 2783.

A religious service of the Covenanters on the lonely moor—a scene from Old Mortality.

SCOTT AND HIS STORIES

CONTINUED FROM 2493

A STRANGER who lived in 1774, and had halted his horse outside the farmstead of Sandy Knowe, might have seen a queer sight through the window.

There, often enough, were two old men kneeling upon the floor before a little boy three years old. One of them wore scarlet and gold lace, while his long, white locks were tied behind in military fashion. He trailed his watch over the carpet, and urged the child to crawl after it. But the child lay still. Tears would gather in the eyes of the other old man. He would exclaim for the twentieth time, "General, there wasn't a bonnier babe in Scotland before he had that fever! In four days—only four days—it took the use of his right leg from him. Do you think he will ever walk again? Be honest, man. Is my grandson to be a poor cripple?"

Then his friend would vow,

"The bairn will walk as sure as his name is Walter Scott!"

True enough, in a year's time the boy was limping about. The limb would always be withered, but it was to bear a tall man over countless miles of heather, and grip the side of many a mettlesome horse.

The lame child, who had been the pet of grandfather and shepherds, was now well enough to return to the house of his father, an attorney in Edinburgh. Here he found a brood of brothers and sisters and a father whose strict religion made Sunday a day of penance. But he also found a mother who made him read aloud to her, sometimes from old ballads, sometimes from translations of Homer. The poetry and the tales delighted him beyond measure.

When he was about seven Walter Scott went to school. He was also coached by a tutor at home. This man "thought it almost a sin to open a profane play or poem." Accordingly the little boy had to wait till the household was at dinner before he dared creep to his mother's dressing-room, take down a volume of Shakespeare that he had found there, and read it by the firelight. He spoke afterward of the rapture he felt as he sat in his nightshirt reading, ready to fly at the sound of a foot on the stairs.

As the boy grew older his studies were extended, and so were his private explorations in the realms of romance. One day these excursions

stood him in good stead. Burns had come to Edinburgh, and everyone was on fire to meet Scotland's greatest poet. Not least in enthusiasm was fifteen-year-old Walter Scott.

At last he had his wish; many distinguished people were present, and the boy sat silent, feeding his eyes on the handsome plowman-poet. It happened that Burns's attention was caught by a picture of a dead soldier; he was deeply moved by it, and asked who had written the lines inscribed beneath the print. None of the learned people could remember, and Walter Scott, who did, was too modest to address the great man himself. He whispered the author's name to a friend. We can readily believe Scott when, thirty years later, we find him saying that he still remembers Burns's look as he turned to thank the hot-cheeked boy.

THE BOY WHO LOVED LIFE SO THAT HE HAD HARDLY TIME TO SLEEP

In legal studies, in reading and in horseback excursions about the country, Walter Scott spent his youth. On these "raids" he and a friend would seek out some place of historic interest and try to discover new legends about it from those who lived near the old battleground or castle. By the time he was called to the bar, Scott was already a fair antiquary. "He was makin' himsell a' the time," said a friend who had ridden with him through districts where no wheeled carriage was known, in search of old memories and queer customs.

At that time there was danger of a French invasion, and Scott founded a volunteer cavalry corps. The drills were at five o'clock in the morning. When they were over he had to hurry home, get into wig and gown, and go to work at Parliament House. In the evening he always had some engagement, for Edinburgh's intelligent society was quick to welcome this handsome, high-spirited and modest youth. Yet his notebooks show that he was reading hungrily all the time with an appetite which ranged from Canute's verse to a list of Charles I's debts. He was in love with life and could hardly spare an hour for sleep.

HOW WALTER SCOTT LEAPED INTO GREAT FAME AS A POET

In 1795 Scott turned a poem by Bürger into English verse to oblige a woman friend. She was astonished at it. The manuscript was shown about, and was printed with some others in 1796. He says that he found himself "almost by accident" engaged on literary work. To the end of his days he held a legal appointment, and was careful not to neglect its drudgery, but in the early hours of the morning and on holiday the young advocate was now a poet. The world listened enchanted to The Lay of the Last Minstrel, The Lady of the Lake and Marmion.

In 1797 he married Charlotte Charpentier, a beautiful and spirited French girl, whose mother had fled from the Revolution and brought up her daughter in England. They had four children, Sophia, Walter, Anne and Charles. Never was a family more devoted. Scott could not bring himself to send the children away, even when they came begging for stories in the midst of his work. They were taught to ride and to laugh at falls very early; his chief lesson to them was this: "Without courage there cannot be truth; and without truth there can be no other virtue." Most of Scott's life, after he was made deputy sheriff of Selkirkshire, was spent on horseback, surrounded by ponies and children and his favorite dogs.

For a long while the little ones knew nothing of their father's literary work, and one day young Walter fought a playfellow who had called him The Lady of the Lake. Moreover, when Sophia was asked if she had read the poem, she replied, "Oh, no! Papa thinks there is nothing worse for children than to read bad poetry."

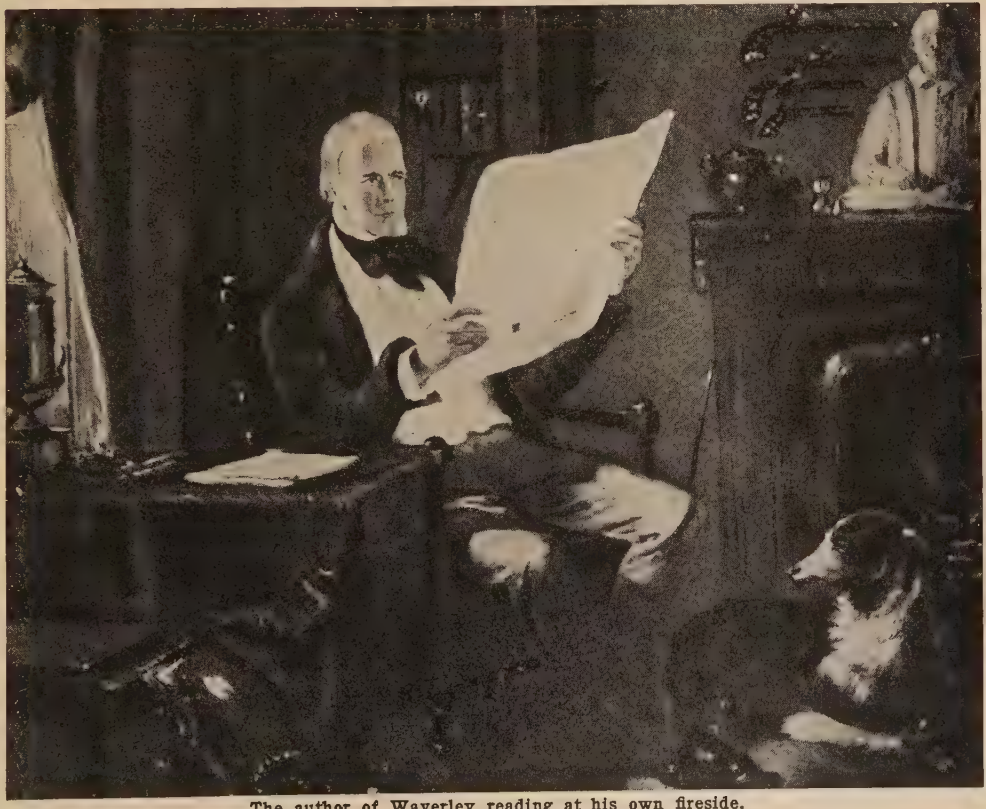
THE TREMENDOUS SUCCESS OF THE FIRST WAVERLEY NOVEL

One day Scott was searching his desk for fishing-flies when he came across some chapters of a story he had begun and left many years ago. It seemed to him that it was no good to write dramatic poems while Byron was in the field: he would take to prose. The novel was finished and published under the title of Waverley, with no author's name. Its success was immediate and overwhelming.

It would be difficult to exaggerate the effect made by the wonderful stories of which this was the first. People were seen reading the new parts in the streets, undergraduates fought for them in the book shops; during the Peninsular War an officer read Scott to his men while they lay flat on the ground under fire. The traffic into Scotland was enormously increased by readers who flocked to see the

THE MOST FAMOUS MAN OF SCOTLAND

Sir Walter Scott finds the lost manuscript of Waverley which brought him fame.



The author of Waverley reading at his own fireside.

scenery of the Waverley Novels; and the author's private house was continually besieged by impertinent visitors of all nationalities.

The novels by which Scott will live while the English language is spoken and while British history remains a subject of interest, were written between the years 1814 and 1829. His poems which first arrested the attention of the reading world were issued six years before Waverley, the first novel, appeared. But if we are to appreciate Scott's range of talent and productive power, we must remember that during the whole of the fifteen years in which he was pouring forth the stories that charmed his own generation, he was also writing poems, literary criticism and history, and editing publications with a historical interest.

A scene from Peveril of the Peak. — From the painting by Sir W. Q. Orchardson.

His writing of novels began almost by accident and was continued as one of a number of occupations. As Waverley proved an immediate and great success, there was no reason why its author should change his method of writing, and he did not change it. What was that style?

We are told by a contemporary of Shakespeare that he dashed off his plays without blotting a line. They came spontaneously from a full-charged mind. And so it was with Scott. He is described by one who overlooked the room in which he wrote the two last volumes of Waverley by night, as throwing down page after page in a heap as he wrote, hour after hour, till the onlooker was worried by the sight of it. Here the very abundance of Scott's ideas is demanding quick expression and driving the willing pen. So it was with all his novels written during his years of vigor.

From what fountains did these streams of tale-telling flow so plentifully? From his boyhood Scott had had a strong sense of the romantic past, linked with a strong sense of place, or locality. Hence his early delight in antiquarianism. He had been a wanderer wherever he could find the delights of scenery and of any fading remnants of history, particularly of the wild or weird or chivalrous kinds. He found, too, a deep pleasure in the study of human character in all its varieties, and noted instinctively anything that was unusual.

Well, start a man with these interests and qualities and with ease in expression, telling a story at a period when form in story-telling had not yet been critically studied, and what shall we find? His rapid sweep of mind will survey history in broad and true outlines, but will not be fettered by small exactnesses. He will claim a large liberty which the plodding student may say approaches looseness, for a breezy freedom is in keeping with an open, manly nature. In such a writer the particular critic will always find faults of failure in small facts. The literary purist may even accuse him of careless constructions of speech, or even of stumbles in grammar. These charges are

all made, though with some daring, against Shakespeare in his grandeur, and they are cast with less reserve against the homelier writings of Walter Scott. They in no way take away from his real greatness. They are but the small dust of the balance in weighing his true worth.

We may grant that his habit of antiquarian and historical research, to please himself, sometimes leads him to overload us with accounts of the past which we can hurry by or reserve till our interest is enlisted afresh. And often he will leave the telling of his story aside while he tells in detail some scene in which a lifelike episode is played; but that is entirely allowable, because the scene is sure to be a small story in itself. Granting this inclination to linger, which was very welcome in the leisurely days when Scott wrote, the main truth about his narrative is that he is the most natural of all our story-tellers.

As soon as the movement of the tale begins we cease to feel as if we were reading something in a book. We are at once looking on a scene in which real people move and talk before our eyes.

Perhaps some part of this intense sense of reality may come from the fact that Scott's imagination seemed to work most freely when he had in truth some actual scene, or occurrence, or character, on which to build. He was at once most free and real when he was placing his characters in scenes he had visited, where a fragment of history or of legend gave him a starting ground. He could expand and ornament better than he could invent. It was his liking for this aid to imagination that made him, of all the novelists, the most successful in giving romance a local color.

If, in thinking of Scott's fine array of stories we notice the order in which they were written, we cannot fail to observe some falling-off in interest and in the quality of the writing after the first five years. There is a more decided general falling-off after the first ten years of tale-telling. These changes correspond to some extent with the troubles of the novelist's busy life. Of course, every reader will have his own favorite books and his special disappointments, but after a hundred years of criticism opinion is not greatly divided concerning admitted successes and comparative failures.

Waverley, the opening story, was, and remains, an amazing first novel. It was

A meeting between Rob Roy and Bailie Nicol Jarvie.
From the painting by J. Watson Nicol in Sheffield Art Gallery.

written with keen enjoyment, and it opens up a fresh field for fiction. It disclosed Scott's tender feeling for the rejected Stuarts, yet showed that he understood the strains in Scottish and Stuart character which made the Stuarts impossible as kings.

THE MEN AND WOMEN OF IMAGINATION WHO WILL LIVE FOREVER

Guy Mannering, which followed Waverley, in 1815, had a more elaborate plot than any tale in the long series. Into it Scott introduced a number of characters that hold a lasting place in his fine gallery of men and women who will live forever. Dandie Dinmont, Meg Merrilies, Dominie Sampson, Dirk Hatteraick, Pleydell, Ellangowan and Colonel Mannering himself—sturdy farmer, gypsy sibyl, stickit minister and schoolmaster, daring smuggler, roystering lawyer, unstable laird and soldier tinged with superstition—are men and woman who, once known, are never forgotten. And there are few in the long list of Scott's later stories that do not add to the collection of welcome acquaintances who are as truly real to us as the most interesting men and women we have ever known.

The Antiquary and Old Mortality, the books of 1816, certainly did not show any decline in vivid portraiture. Many of us indeed, would place The Antiquary very near, if not at, the head of the Waverley list of great stories. Certainly no character in the realm of fiction has greater charm than the wandering beggar, Edie Ochiltree, and the antiquary himself is a clever study. The plot of the book, however, is a little strained. Rob Roy (1817), besides its romantic chieftain strolling in and out of the story, has the wholly delightful Bailie Nicol Jarvie. In Di Vernon we have a woman who competes with Rebecca, the Jewess in Ivanhoe, for the distinction of being the finest character that Scott ever drew.

THE AMAZING PHYSICAL TRIUMPH OF SIR WALTER SCOTT

The year 1819, though it was a time of acute physical suffering for the author and compelled him to employ a copyist, was the most triumphantly productive year of his busy life. In it he published The Heart of Midlothian, regarded by many as the story in which he reached his high-water mark; the tragic Bride of Lammermoor, with Caleb Balderstone as a relief from its gloom; the Legend of Montrose, and the perfect man-at-arms, Dugald Dalgetty, of whom there have been many imitations, and, most striking of all, Ivanhoe, by far the most popular of Scott's stories, and in spite of its departures from strict history, the most deserving of popularity. There is no other instance in the whole story of literature of such heroic and successful industry in the midst of pain.

It is not to be wondered at that there was a falling-off in 1820 in The Monastery and The Abbot, that was hardly redeemed by the interest of Kenilworth in 1821. In 1822, however, The Fortunes of Nigel, which followed King James to London, showed that the master had only temporarily let down in his work after his illness. Quentin Durward, written in 1823, and Redgauntlet, in 1824, were as fine as the best of his earlier successes. These stories were accompanied by some of less note: The Pirate, Peveril of the Peak, St. Ronan's Well, The Betrothed and The Talisman, though the last has thrilled the heart of many boys and girls.

THE REALMS OF GOLD IN WHICH ALL WHO WILL MAY DWELL

Then came the crash of Scott's fortunes, after which he wrote to pay debts that were not properly his own. For the next seven years he wrote stories of which only The Fair Maid of Perth, Woodstock and Anne of Geierstein can be named as ranking with those that are somewhat short of the best. The rest, continued till 1831, were the dutiful efforts of failing strength.

But what a marvelous procession of enriching books it is! What a panorama of history and of human character it presents! With the most natural of all the story-tellers we can roam through the world, and through six centuries, and keep company by the way with a man whose instinctive robustness of character and broad-minded honesty is a tonic of the finest quality.

Wealth came with fame. Scott had always longed to live on his own land like his ancestor, the Laird of Raeburn. The building of Abbotsford crowned his desire. The house was reared on the scene of the battle of Melrose, and close to a glen where Thomas the Rhymer was said to have met the Queen of Faerie: he had often visited the place in childhood. Gradually he acquired about a thousand acres, and his friends, pensioners and

SIR WALTER SCOTT'S HOME ON THE TWEED

Here is a picture of Abbotsford, the picturesque home of the great novelist, Sir Walter Scott. Abbotsford was the pride of Sir Walter's heart. He purchased the place in 1811, and on it he built his home, adding to it from time to time, until it became the imposing gabled mansion we see in the picture. It was at Abbotsford that Scott wrote the Waverley Novels, and it was here that he died. The house gained its name from the ford across the river Tweed, which the Abbots of Melrose Abbey used in ancient times. The estate was occupied for many years by descendants of the novelist, and was then rented to an American family.

married daughters were established in houses on the estate.

THE FAMOUS MAN WHO WAS EVERYBODY'S FRIEND AND EVERYBODY'S HELPER

Friendship played so large a part in Scott's life that we must consider it here, however briefly. In his early life he once refused to live in a certain house because it was "hemmed in by hedges and ditches, not to mention Dukes and Dowagers, which are bad things for little people." He despised snobbery, but he had no narrow prejudice against rank; to be intelligent or poor was a certain passport to his affections. So we find that his friendship was shared by poverty-stricken students who came from cottages, like Hogg and Leyden, and by "Dukes and Dowagers"; by King George IV and Tom Purdie, who was brought before the sheriff for poaching, told a pitiful story of hungry children and was made steward of Abbotsford. All the poets of Scott's day were his friends.

THE BLOW THAT CAME TO SCOTT AT THE HEIGHT OF HIS FAME

Crabbe, who turned village life to poetry in his country parsonage, had long been a correspondent of Scott's, and had often been urged to visit the Highlands, but the English poet was old and shrank from the post-chaise. In 1822 George IV visited Scotland—the first of his dynasty to do so. Sir Walter rowed out to the royal George to welcome him. The king drank his health, and the novelist begged for the glass as a memento of the historic occasion. He placed it in his coat-tail pocket, and carried that portion of his clothing before him as if it were a baby. On his return home he was astonished to find Crabbe. Kings and ceremonies were instantly forgotten. The two embraced, and were presently seated. But not for long. Scott leaped up with a scream: the king's glass was smashed to atoms.

Now we must turn to a friendship which was fatal to him. James Ballantyne was his school-fellow and afterward his printer. In order to help him Scott became a partner and lent the firm large sums of money, besides making personal loans to James and John his brother. Unfortunately they were not good business men, nor were they courageous enough to tell Scott that the firm was in difficulties when he was spending large sums of money on his estate. They became involved with Constable's bookselling business. In 1825, in a time of general distress, sudden ruin came to both houses. The Ballantynes declared themselves bankrupt, and Scott might have done likewise, but his sense of honor forbade him to treat commercial debts in a commercial manner. He shouldered a debt of $650,000 and dedicated the rest of his life to paying it.

THE NOBLE LIFE THAT ENDED IN YEARS OF STRUGGLE AND TOIL

In the midst of the suspense and false hopes of this dark time Scott suffered the crowning blow of his wife's death. It is good to know that there were some gleams of comfort in his misery; that his old servants refused to leave him, the butler becoming a sort of general servant, and the coachman taking his horses to the plow; that offers of assistance came from every side—to be gratefully declined; and that it was said: "The Author of Waverley ruined! Let every man to whom he has given months of delight give him a sixpence, and he will rise to-morrow morning richer than Rothschild."

The writing which had been a joy to him was now a bond-slave's task. He worked himself to death—the tragic, humiliating death of apoplectic paralysis. He had always dreaded its "muddiness of mind."

It was hoped that a voyage would do him good. While he was in Frankfort a certain shopkeeper brought out some things which he thought likely to tempt an English customer. One was a print of Abbotsford. Scott said, "I know that already, sir," and hurried away. They brought him home to die.

There was a scene of almost unbearable pathos toward the end. Feeling himself much better, he asked to be carried to his desk and given a pen; but he could not hold it. Tears rolled down his face. After a little he said, "Friends, don't let me expose myself—get me to bed—that's the only place." However much his noble mind might wander, his courtesy and patience never left him; it was said that the gentleman outlived the genius.

In 1832 he passed quietly away, on a still September noon, when the sound of his dear Tweed rippling over its pebbles came clearly through the open window.

He paid his creditors with his life. He did not think health and life too great a price to pay for self-respect. Surely he was as good a knight as any of his heroes.

THE NEXT STORY OF LITERATURE IS ON PAGE 2731.

WORDSWORTH'S GREATEST POEM

WE have read many of Wordsworth's poems in this book, and we are now to read the greatest of all the many poems he wrote, though by no means the longest. Many people may think that it is too difficult for children to understand; but children can understand far more than is often supposed, and there is no real reason why they should not read this famous ode, with some explanations. Its full title is: Ode on the Intimations of Immortality from Recollections of Early Childhood. That is to say, the poet in manhood seeks to base his belief in the future life on recollections of the thoughts that came to him as a boy. Surely that fact alone makes his great poem a suitable one for printing in this book.

INTIMATIONS OF IMMORTALITY

CONTINUED FROM 2530

The poet begins by stating that the dreams and visions of his youth had made the earth in early years so beautiful to him that in later life, when the commoner sights had become so familiar to him, they seemed to have lost some of the qualities they once possessed.

THERE was a time when meadow, grove, and stream,
The earth, and every common sight,
To me did seem
Apparelled in celestial light,
The glory and the freshness of a dream.
It is not now as it hath been of yore;—
Turn wheresoe'er I may,
By night or day,
The things which I have seen I now can see no more.

II

His knowledge tells him that earth and its wonders are not less fair than when he was young; but they have lost the "glory" which his young eyes and opening mind first beheld. As we grow older, we all experience the same change of feeling.

The Rainbow comes and goes,
And lovely is the Rose;
The Moon doth with delight
Look round her when the heavens are bare;
Waters on a starry night
Are beautiful and fair;
The sunshine is a glorious birth;
But yet I know, where'er I go,
That there hath passed away a glory from the earth.

III

But there are times later in life when the singing of the birds and the frisking of the lambs suddenly bring up, as in a flash, our childhood's happy visions, and we are as children again in memory.

Now, while the Birds thus sing a joyous song,
And while the young Lambs bound
As to the tabor's sound,
To me alone there came a thought of grief:
A timely utterance gave that thought relief,
And I again am strong.
The Cataracts blow their trumpets from the steep;
No more shall grief of mine the season wrong;
I hear the Echoes through the mountains throng,
The Winds come to me from the fields of sleep,
And all the earth is gay;
Land and Sea
Give themselves up to jollity,
And with the heart of May
Doth every Beast keep holiday;—
Thou Child of Joy,
Shout round me, let me hear thy shouts, thou happy Shepherd-boy!

IV

In the midst of his delight in thus living over again his childhood's joys, the poet finds himself making note of some things—a tree and a field—that seem to be different now as compared with his early visions of them; thus the spell is broken—he is a man again, and saddened because of a lost delight.

Ye blessèd Creatures, I have heard the call
Ye to each other make; I see
The heavens laugh with you in your jubilee;
My heart is at your festival,
My head hath its coronal,
The fulness of your bliss, I feel—I feel it all.
O evil day! if I were sullen
While the Earth herself is adorning
This sweet May morning,
And the Children are culling
On every side,
In a thousand valleys far and wide,
Fresh flowers; while the sun shines warm,
And the Babe leaps up on his Mother's arm:—
I hear, I hear, with joy I hear!
—But there's a Tree, of many, one,
A single Field which I have looked upon,
Both of them speak of something that is gone;
The Pansy at my feet
Doth the same tale repeat:
Whither is fled the visionary gleam?
Where is it now, the glory and the dream?

V

Then he begins to think what these visions may mean. In this stanza he sets forth his thoughts. We may have lived before, and as in manhood we catch fleeting visions of our childhood, so may we have faint visions of a previous existence. We do not seem to be able to think of the soul as having a beginning or an end.

Our birth is but a sleep and a forgetting:
The Soul that rises with us, our life's Star,
Hath had elsewhere its setting,
And cometh from afar:
Not in entire forgetfulness,
And not in utter nakedness,
But trailing clouds of glory do we come
From God, who is our home:
Heaven lies about us in our infancy!
Shades of the prison-house begin to close
Upon the growing Boy,
But he beholds the light, and whence it flows,
He sees it in his joy;
The Youth, who daily farther from the East
Must travel, still is Nature's Priest,
And by the vision splendid
Is on his way attended;
At length the Man perceives it die away,
And fade into the light of common day.

VI

It may be, the poet suggests, that our present existence here on earth, with all its distractions and pleasures, has dulled in us the memory of the "imperial palace," or heaven, whence our souls have come, just as the experiences of manhood dull the memories of childhood.

Earth fills her lap with pleasures of her own;
Yearnings she hath in her own natural kind,
And even with something of a Mother's mind,
And no unworthy aim,
The homely Nurse doth all she can,
To make her Foster-child, her Inmate Man,
Forget the glories he hath known,
And that imperial palace whence he came.

VII

The thought expressed in the previous stanza is followed further in this one. But we are to remember that the poet never asserts as a fact that he believes in a past existence. The idea is a very old one and is a feature of some religions, such as Buddhism, and the poet suggests it for a poetic purpose which will presently appear.

Behold the Child among his new-born blisses,
A six years' darling of a pigmy size!
See, where mid work of his own hand he lies,
Fretted by sallies of his Mother's kisses,
With light upon him from his Father's eyes!
See, at his feet, some little plan or chart,
Some fragment from his dream of human life,
Shaped by himself with newly-learnèd art;
A wedding or a festival,
A mourning or a funeral;
And this hath now his heart,
And unto this he frames his song:
Then will he fit his tongue
To dialogues of business, love, or strife:
But it will not be long
Ere this be thrown aside,
And with new joy and pride
The little Actor cons another part;
Filling from time to time his "humorous stage"
With all the Persons, down to palsied Age,
That Life brings with her in her equipage;
As if his whole vocation
Were endless imitation.

VIII

The poet now addresses the child. The little boy, the little girl, is the greatest wonder of the world! For in his little body is the seed of everlasting life; he is "glorious in the sight of heaven-born freedom." But as the years grow upon him he will become less and less conscious of the wonders he moves among; "custom" will "lie upon" him heavily; he will do his daily work with far too little thought of his immortal powers.

Thou, whose exterior semblance doth belie
Thy Soul's immensity;
Thou best Philosopher, who yet dost keep
Thy heritage; thou Eye among the blind,
That, deaf and silent, read'st the eternal deep,
Haunted for ever by the eternal mind,—
Mighty Prophet! Seer blest!
On whom those truths do rest,
Which we are toiling all our lives to find,
In darkness lost, the darkness of the grave:
Thou, over whom thy Immortality
Broods like the Day, a master o'er a Slave,
A Presence which is not to be put by;
Thou little Child, yet glorious in the might
Of heaven-born freedom on thy being's height,
Why with such earnest pains dost thou provoke
The years to bring the inevitable yoke,
Thus blindly with thy blessedness at strife?
Full soon thy Soul shall have her earthly freight,
And custom lie upon thee with a weight.
Heavy as frost, and deep almost as life!

IX

In our later years, when our knowledge is ripened, we realize that these visions of childhood have a mighty power in opening for us the gateway of immortality. They are not so much to be regarded as glimpses of a life that is past as of an immortal life of the soul which endures forever. The fact that such thoughts ever arise in us is a proof that what the soul demands God will supply, and that there exists for us some other life beyond the life which we know in this world. These memories are like the echoes, far away and faint, of a great sea. The thought of immortality as a mighty ocean upon which the soul is voyaging—an endless sea upon which the frail bark of life has been launched—is a very beautiful one. This stanza is perhaps the most notable in the poem.

O joy! that in our embers
Is something that doth live,
That nature yet remembers
What was so fugitive!
The thought of our past years in me doth breed
Perpetual benediction: not indeed
For that which is most worthy to be blest—
Delight and liberty, the simple creed
Of Childhood, whether busy or at rest,
With new-fledged hope still fluttering in his breast:—
Not for these I raise
The song of thanks and praise;
But for those obstinate questionings
Of sense and outward things,
Fallings from us, vanishings;
Blank misgivings of a Creature
Moving about in worlds not realized,
High instincts before which our mortal Nature
Did tremble like a guilty thing surprised:
But for those first affections,
Those shadowy recollections,
Which, be they what they may,
Are yet the fountain-light of all our day,

THE HEAVEN THAT LIES ABOUT A CHILD

In this picture, by Herbert Draper, we catch something of Wordsworth's idea when he wrote: "Trailing clouds of glory do we come from God, who is our home; heaven lies about us in our infancy." Gazing at the sunlight as it pours through the stained-glass windows, the child seems to see visions of paradise.

Are yet a master-light of all our seeing;
Uphold us, cherish, and have power to make
Our noisy years seem moments in the being
Of the eternal Silence: truths that wake,
To perish never;
Which neither listlessness, nor mad endeavor,
Nor Man nor Boy,
Nor all that is at enmity with joy,
Can utterly abolish or destroy!
Hence, in a season of calm weather,
Though inland far we be,
Our Souls have sight of that immortal sea
Which brought us hither,
Can in a moment travel thither,
And see the children sport upon the shore,
And hear the mighty waters rolling evermore.

X

This stanza opens as with a burst of joyous song. Let us not grieve, but rejoice, the poet tells us, for we are far other than children now and can look upon life calmly and with faith and hope.

Then sing, ye Birds, sing, sing a joyous song!
And let the young Lambs bound
As to the tabor's sound!
We in thought will join your throng,
Ye that pipe and ye that play,
Ye that through your hearts to-day
Feel the gladness of the May!
What though the radiance which was once so bright
Be now for ever taken from my sight,
Though nothing can bring back the hour
Of splendor in the grass, of glory in the flower;
We will grieve not, rather find
Strength in what remains behind:
In the primal sympathy
Which having been must ever be;
In the soothing thoughts that spring
Out of human suffering;
In the faith that looks through death,
In years that bring the philosophic mind.

XI

The last two lines of the poem are very often quoted. Wordsworth was a great poet of nature, and loved the brooks and the skies and the meadows and the grass, and saw God in "the meanest flower that blows." The feeling of certainty is born of these loves that they and he can never part and are immortal.

And O, ye Fountains, Meadows, Hills, and Groves,
Forebode not any severing of our loves!
Yet in my heart of hearts I feel your might;
I only have relinquished one delight
To live beneath your more habitual sway.
I love the Brooks, which down their channels fret,
Even more than when I tripped lightly as they:
The innocent brightness of a new-born Day
Is lovely yet;
The Clouds that gather round the setting sun
Do take a sober coloring from an eye
That hath kept watch o'er man's mortality;
Another race hath been, and other palms are won.
Thanks to the human heart by which we live,
Thanks to its tenderness, its joys, and fears,
To me the meanest flower that blows can give
Thoughts that do often lie too deep for tears.

INTEGER VITAE

Quintus Horatius Flaccus, who wrote this inspiring poem of the merits of a blameless life, was one of the most popular Roman poets during the latter part of the first century B.C. The translation of the poem given here was made by Thomas Campion at the end of the sixteenth or the beginning of the seventeenth century.

THE man of life upright,
Whose guiltless heart is free
From all dishonest deeds,
Or thought of vanity;

The man whose silent days
In harmless joys are spent,
Whom hope cannot delude,
Nor sorrow discontent;

That man needs neither towers
Nor armor for defense,
Nor secret vaults to fly
From thunder's violence:

He only can behold
With unaffrighted eyes
The horrors of the deep
And terrors of the skies.

Thus, scorning all the cäres
That fate or fortune brings,
He makes the heaven his book,—
His wisdom heavenly things;

Good thoughts his only friends,
His wealth a well-spent age,
The earth his sober inn
And quiet pilgrimage.

QUEEN MAB AND HER FAIRIES

No one knows who wrote this merry song describing the midnight revels of the fairies. The date usually given for it is 1635. There is a wild love of play and mischief, but all is bright and dainty, as fairy doings must be.

COME follow, follow me,
You fairy elves that be:
Which circle on the greene,
Come follow Mab your queene.
Hand in hand let's dance around,
For this place is fairye ground.

When mortals are at rest,
And snoring in their nest,
Unheard, and unespyed,
Through keyholes we do glide;
Over tables, stools and shelves
We trip it with our fairy elves.

Upon a mushroome's head
Our tablecloth we spread;
A grain of rye or wheat
Is manchet, which we eat;
Pearly drops of dew we drink,
In acorn cups filled to the brink.

The grasshopper, gnat, and fly,
Serve for our minstrelsie;
Grace said, we dance a while,
And so the time beguile:
And if the moon doth hide her head,
The gloe-worm lights us home to bed.

On tops of dewie grasse
So nimbly do we passe,
The young and tender stalk
Ne'er bends when we do walk;
Yet in the morning may be seen
Where we the night before have been.

THE WEAKEST THING

Elizabeth Barrett Browning, who wrote this lovely little poem, did not always succeed in being musical in her choice of words, but she succeeds happily here while depicting the moods to which our hearts are subject. Poets often put into their songs a deep undertone of meaning, and it may be so here in the last verse, with God, the moving heart of all things, strengthening our weak hearts in their need.

WHICH is the weakest thing of all
Mine heart can ponder?
The sun, a little cloud can pall
With darkness yonder?
The cloud, a little wind can move
Where'er it listeth?
The wind, a little leaf above,
Though sere, resisteth?

What time that yellow leaf was green,
My days were gladder;
But now, whatever Spring may mean,
I must grow sadder.
Ah me! a *leaf* with sighs can wring
My lips asunder?
Then is mine heart the weakest thing
Itself can ponder.

Yet, Heart, when sun and cloud are pined
And drop together,
And at a blast which is not wind,
The forests wither,
Thou, from the darkening deathly curse,
To glory breakest,—
The Strongest of the universe
Guarding the weakest!

THERE'S A GOOD TIME COMING

This song, written by Charles Mackay, has the ring of downright sincerity and a wealth of homely wisdom. The "good time" he sang of has not yet come, but it draws nearer every year.

THERE'S a good time coming, boys,
A good time coming:
There's a good time coming, boys—
Wait a little longer.
We may not live to see the day,
But earth shall glisten in the ray
Of the good time coming.
Cannon-balls may aid the truth,
But thought's a weapon stronger;
We'll win our battle by its aid—
Wait a little longer.

Chorus

Oh, there's a good time coming, boys,
There's a good time coming:
There's a good time coming, boys—
Wait a little longer.

There's a good time coming, boys,
A good time coming:
The pen shall supersede the sword,
And right, not might, shall be the lord,
In the good time coming.
Worth, not birth, shall rule mankind,
And be acknowledged stronger.
The proper impulse has been given—
Wait a little longer.

There's a good time coming, boys,
A good time coming:
Hateful rivalries of creed
Shall not make their martyrs bleed
In the good time coming.
Religion shall be shorn of pride,
And flourish all the stronger;
And Charity shall trim her lamp—
Wait a little longer.

There's a good time coming, boys,
A good time coming:
War in all men's eyes shall be
A monster of iniquity
In the good time coming.
Nations shall not quarrel then
To prove which is the stronger,
Nor slaughter men for glory's sake—
Wait a little longer.

AT LAST

John Greenleaf Whittier, the Quaker poet, lived to be eighty-five years old. Toward the end of his life he could sing with undimmed faith of his simple all-sufficing trust in God. He is the author of many familiar poems.

WHEN on my day of life the night is falling,
And in the winds from unsunned spaces blown,
I hear far voices out of darkness calling
My feet to paths unknown,

Thou who hast made my home of life so pleasant,
Leave not its tenant when its walls decay;
O Love divine, O Helper ever present,
Be Thou my strength and stay!

Be near me when all else is from me drifting:
Earth, sky, home's pictures, days of shade and shine,
And kindly faces to my own uplifting
The love which answers mine.

I have but Thee, O Father! Let Thy Spirit
Be with me then to comfort and uphold;
No gate of pearl, no branch of palm I merit,
Nor street of shining gold.

Suffice it if—my good and ill unreckoned,
And both forgiven through Thy abounding grace—
I find myself by hands familiar beckoned
Unto my fitting place.

Some humble door among Thy many mansions,
Some sheltering shade where sin and striving cease,
And flows for ever through heaven's green expansions
The river of Thy peace.

There, from the music round about me stealing,
I fain would learn the new and holy song,
And find, at last, beneath Thy trees of healing,
The life for which I long.

HAPPINESS

It is not always easy to keep cheerful, but the author of these few lines suggests that happiness comes to those who try each day to be helpful, loyal, kind and true.

JUST to be tender, just to be true;
Just to be glad the whole day through;
Just to be merciful, just to be mild;
Just to be trustful as a child;
Just to be gentle and kind and sweet;
Just to be helpful with willing feet;
Just to be cheery when things go wrong;
Just to drive sadness away with a song;
Whether the hour is dark or bright,
Just to be loyal to God and right!

TO THE RIVER CHARLES

Longfellow, the American poet, as has often been pointed out, loves to celebrate in verse scenes of natural beauty. Almost everywhere he traveled or lived during his life he found some subject to write about in the rivers, mountains, towns or castles. The river Charles, of which he sings in this poem, is a stream that flows into the sea at Boston harbor.

RIVER that in silence windest
Through the meadows, bright and free,
Till at length thy rest thou findest
In the bosom of the sea,

Four long years of mingled feeling,
Half in rest, and half in strife,
I have seen thy waters stealing
Onward, like the stream of life.

Thou hast taught me, silent river,
Many a lesson deep and long;
Thou hast been a generous giver,
I can give thee but a song.

Oft in sadness, and in illness,
I have watched thy current glide,
Till the beauty of its stillness
Overflowed me, like a tide.

And in better hours and brighter,
When I saw thy waters gleam,
I have felt my heart beat lighter,
And leap onward with thy stream.

Not for this alone I love thee,
Nor because thy waves of blue
From celestial seas above thee
Take their own celestial hue.

Where yon shadowy woodlands hide thee,
And thy waters disappear,
Friends I love have dwelt beside thee,
And have made thy margin dear.

THE BUTTERFLY AND THE SNAIL

Elsewhere one of the fables in verse by John Gay is printed. Another poem of the same kind by that author is here given. In this class of poetry there is very little scope for originality, either of thought or form. Fables in verse are very much alike, but, if they are as well written as those of Gay, they never tire the reader, and even when the "moral" is an old one, it has the enduring value of a good sermon, which, as we know, can be preached more than once.

AS in the sunshine of the morn
A butterfly (but newly born)
Sat proudly perking on a rose,
With pert conceit his bosom glows;
His wings (all glorious to behold)
Bedropt with azure, jet, and gold,
Wide he displays; the spangled dew
Reflects his eyes and various hue.
His now forgotten friend, a snail,
Beneath his house, with slimy trail,
Crawls o'er the grass, whom when he spies,
In wrath he to the gardener cries:
"What means yon peasant's daily toil,
From choking weeds to rid the soil?
Why wake you to the morning's care?
Why with new arts correct the year?
Why grows the peach's crimson hue?
And why the plum's inviting blue?
Were they to feast his taste designed,
That vermin of voracious kind?
Crush then the slow, the pilfering race,
So purge thy garden from disgrace."
"What arrogance!" the snail replied;
"How insolent is upstart pride!
Hadst thou not thus, with insult vain,
Provoked my patience to complain,
I had concealed thy meaner birth,
Nor traced thee to the scum of earth;
For scarce nine suns have waked the hours,
To swell the fruit and paint the flowers,
Since I thy humbler life surveyed,
In base, in sordid guise arrayed.
I own my humble life, good friend;
Snail was I born and snail shall end.
And what's a butterfly? At best
He's but a caterpillar drest;
And all thy race (a numerous seed)
Shall prove of caterpillar breed."

BIG AND LITTLE THINGS

Alfred H. Miles, a poet of no mean ability, has written much that is suitable for grown-ups as well as for children. We have chosen here one of his pieces for young people, which conveys a useful lesson in clear and familiar language. A child may easily learn to repeat it.

I CANNOT do the big things
That I should like to do,
To make the earth for ever fair,
The sky for ever blue.

But I can do the small things
That help to make it sweet;
Tho' clouds arise and fill the skies,
And tempests beat.

I cannot stay the raindrops
That tumble from the skies;
But I can wipe the tears away
From baby's pretty eyes.

I cannot make the sun shine,
Or warm the winter bleak;
But I can make the summer come
On sister's rosy cheek.

I cannot stay the storm clouds,
Or drive them from their place;
But I can clear the clouds away
From brother's troubled face.

I cannot make the corn grow,
Or work upon the land;
But I can put new strength and will
In father's busy hand.

I cannot stay the east wind,
Or thaw its icy smart;
But I can keep a corner warm
In mother's loving heart.

I cannot do the big things
That I should like to do,
To make the earth for ever fair,
The sky for ever blue.

But I can do the small things
That help to make it sweet;
Tho' clouds arise and fill the skies,
And tempests beat.

LITTLE VERSES FOR LITTLE PEOPLE

THE man in the wilderness asked me,
How many strawberries grew in the sea?
I answered him, as I thought good,
As many red herrings as grew in the wood.

PEG, Peg, with a wooden leg,
Her father was a miller;
He tossed the dumpling at her head,
And said he could not kill her.

I HAD a little moppet,
I put it in my pocket,
And fed it with corn and hay,
There came a proud beggar
And swore he would have her,
And stole my little moppet away.

SIMON BRODIE had a cow;
He lost his cow and could not find her;
When he had done what man could do,
The cow came home and her tail behind her.

THE King of Clubs, he often drubs
His loving Queen and wife.
The Queen of Clubs returns his snubs,
And all is noise and strife.
The Knave of Clubs gives winks and rubs,
And swears he'll take her part!
For when our kings will do such things,
They should be made to smart.

The Diamond King I fain would sing,
And likewise his fair Queen,
But that the Knave, a haughty slave,
Must needs step in between.
"Good Diamond King, with hempen string
This haughty Knave destroy!
Then may your Queen, with mind serene,
Your royal love enjoy."

The King of Spades, he kissed the maids,
Which grieved the Queen full sore;
The Queen of Spades, she beat those maids
And turned them out of door.
The Knave of Spades grieved for those jades,
And did for them implore;
The Queen so gent, she did relent,
And vowed she'd strike no more.

MARY had a pretty bird,
Feathers bright and yellow;
Slender legs—upon my word,
He was a pretty fellow.
The sweetest note he always sung,
Which much delighted Mary;
She often, where the cage was hung,
Sat hearing her canary.

THE Robin and the Wren
Fought about the porridge-pan;
And ere the Robin got a spoon,
The Wren had ate the porridge down.

ON Saturday night
Shall be all my care
To powder my locks
And curl my hair.

On Sunday morning
My love will come in,
When he will marry me
With a gold ring.

TWO little dogs sat by the fire,
Over a fender of coal-dust;
When one said to the other dog,
"If Pompey won't talk, why, I must."

AS little Jenny Wren
Was sitting by the shed,
She waggled with her tail,
And nodded with her head.

She waggled with her tail,
And nodded with her head,
As little Jenny Wren
Was sitting by the shed.

HUSH, baby my dolly, I pray you don't cry,
And I'll give you some bread and some milk by and by;
Or perhaps you like custard, or may be a tart,
Then to either you're welcome, with all my heart.

GREAT A, little a, bouncing B,
The cat's in the cupboard and she can't see.

HEY diddle, dinkety, poppety, pet,
The merchants of London they wear scarlet;
Silk in the collar, and gold in the hem,
So merrily march the merchantmen.

LITTLE VERSES FOR VERY LITTLE PEOPLE

THE OWL-CRITIC *

WHO stuffed that white owl? No one spoke in the shop:
The barber was busy, and he couldn't stop;
The customers, waiting their turns, were all reading
The Daily, the Herald, the Post, little heeding
The young man who blurted out such a blunt question;
Not one raised a head, or even made a suggestion;
And the barber kept on shaving.

"Don't you see, Mr. Brown,"
Cried the youth, with a frown,
"How wrong the whole thing is,
How preposterous each wing is,
How flattened the head is, how jammed down the neck is—
In short, the whole owl, what an ignorant wreck 'tis!
I make no apology;
I've learned owl-eology.
I've passed days and nights in a hundred collections,
And cannot be blinded to any deflections
Arising from unskilful fingers that fail
To stuff a bird right, from his beak to his tail.
Mister Brown! Mister Brown!
Do take that bird down,
Or you'll soon be the laughing-stock all over town!"
And the barber kept on shaving.

"I've *studied* owls,
And other night fowls,
And I tell you
What I know to be true:
An owl cannot roost
With his limbs so unloosed;
No owl in this world
Ever had his claws curled,
Ever had his legs slanted,
Ever had his bill canted,
Ever had his neck screwed
Into that attitude.
He can't *do* it, because
'Tis against all bird-laws.
Anatomy teaches,
Ornithology preaches,

An owl has a toe
That *can't* turn out so!
I've made the white owl my study for years,
And to see such a job almost moves me to tears!
Mister Brown, I'm amazed
You should be so gone crazed
As to put up a bird
In that posture absurd!
To *look* at that owl really brings on a dizziness;
The man who stuffed *him* don't half know his business!"
And the barber kept on shaving.

"Examine those eyes.
I'm filled with surprise
Taxidermists should pass
Off on you such poor glass;
So unnatural they seem
They'd make Audubon scream,
And John Burroughs laugh
To encounter such chaff.
Do take that bird down;
Have him stuffed again, Brown!"
And the barber kept on shaving.

"With some sawdust and bark
I could stuff in the dark
An owl better than that.
I could make an old hat
Look more like an owl
Than that horrid fowl,
Stuck up there so stiff like a side of coarse leather.
In fact, about *him* there's not one natural feather."

Just then, with a wink and a sly normal lurch,
The owl, very gravely, got down from his perch,
Walked round, and regarded his fault-finding critic
(Who thought he was stuffed) with a glance analytic,
And then fairly hooted, as if he should say:
"Your learning's at fault this time anyway;
Don't waste it again on a live bird, I pray.
I'm an owl; you're another. Sir Critic, good-day!"
And the barber kept on shaving.

JAMES T. FIELD.

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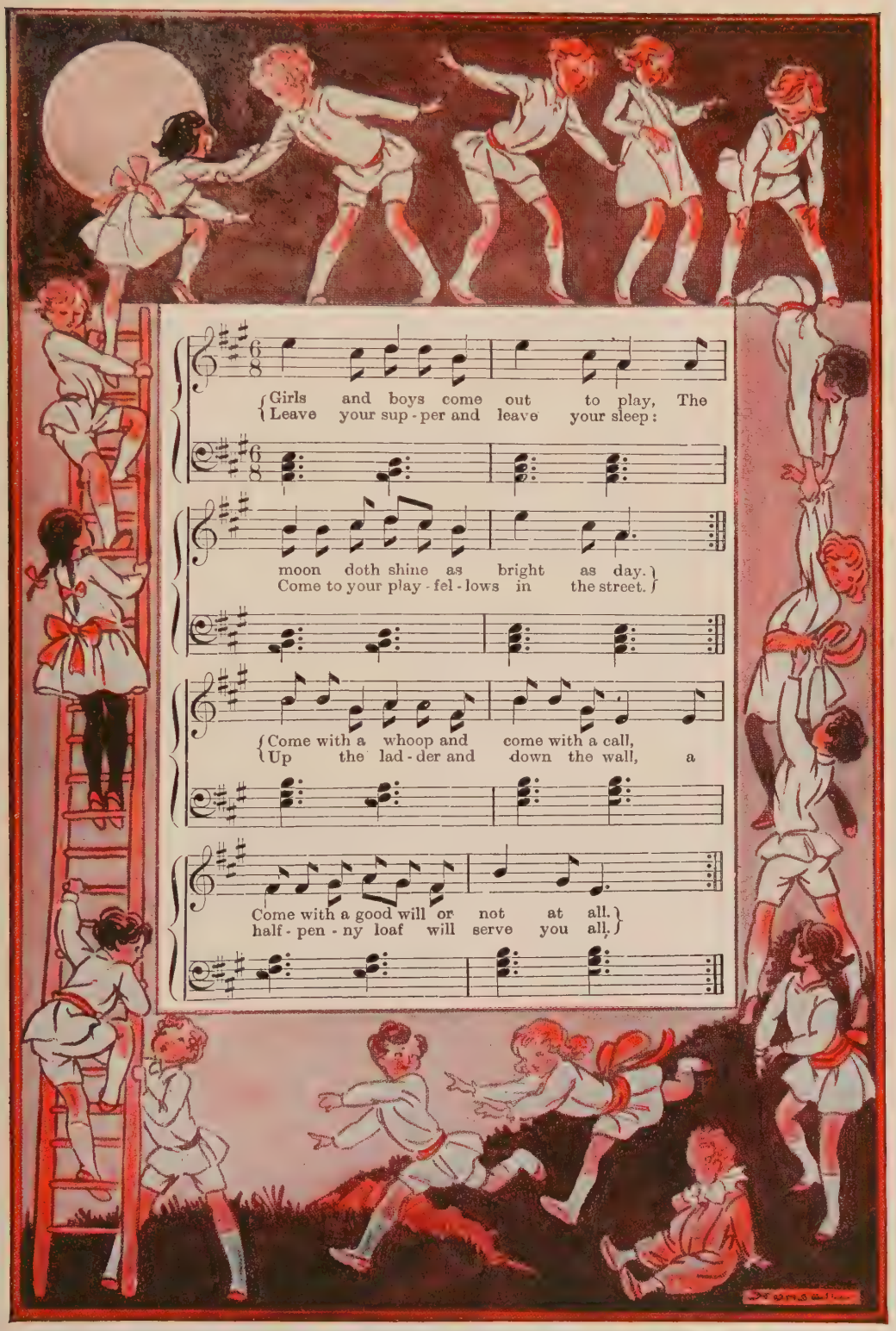
GIRLS AND BOYS COME OUT TO PLAY

I LOVE little pussy,
Her coat is so warm,
And if I don't hurt her,
She'll do me no harm.

So I'll not pull her tail,
Or drive her away,
But pussy and I
Very gently will play.

She will sit by my side,
And I'll give her her food,
And she'll like me because
I am gentle and good.

SEE a pin and pick it up,
All the day you'll have good luck;
See a pin and let it lay,
Bad luck you'll have all the day.

MY house is red—a little house,
A happy child am I:
I laugh and play the livelong day,
I hardly ever cry.

I have a tree, a green, green tree,
To shade me from the sun;
And under it I often sit,
When all my work is done.

My little basket I will take,
And trip into the town.
When next I'm there I'll buy some cake,
And spend my bright half-crown.

MY dear, do you know,
How a long time ago
Two poor little children,
Whose names I don't know,
Were stolen away on a fine summer's day,
And left in a wood, as I've heard people say?
And when it was night,
So sad was their plight,
The sun it went down,
And the moon gave no light.
They sobbed and they sighed, and they bitterly cried,
And the poor little things, they lay down and died.
And when they were dead,
The robins so red
Brought strawberry-leaves,
And over them spread.
And all the day long
They sung them this song:
"Poor babes in the wood!
Poor babes in the wood!
And don't you remember the babes in the wood?"

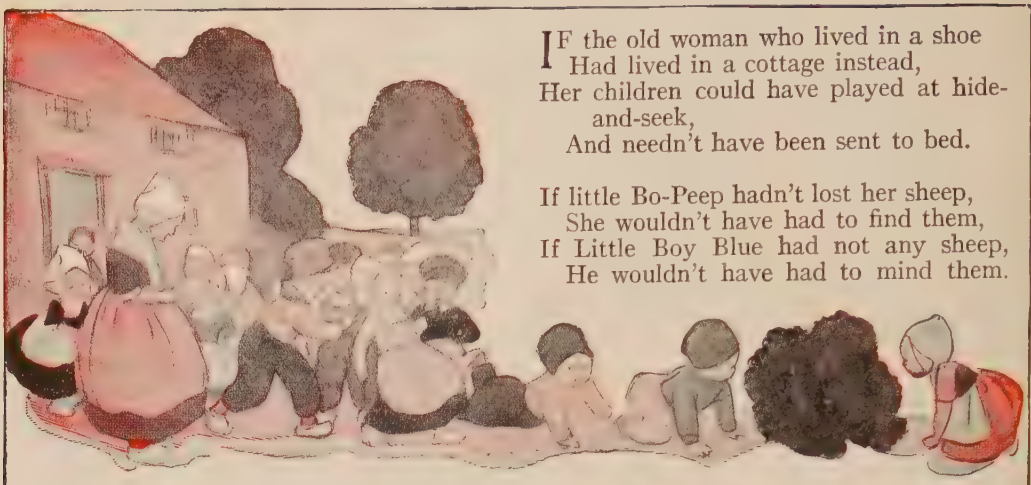
I NEVER saw a Purple Cow,
I never hope to see one;
But I can tell you, anyhow,
I'd rather see than be one.

POLLY, PUT THE KETTLE ON

Pol - ly, put the ket - tle on, Pol ly, put the ket - tle on, Pol - ly, put the

ket - tle on, We'll all have tea. Sukey, take it off a - gain,

Suk - ey, take it off a - gain, Suk-ey, take it off a-gain, They've all gone a - way.



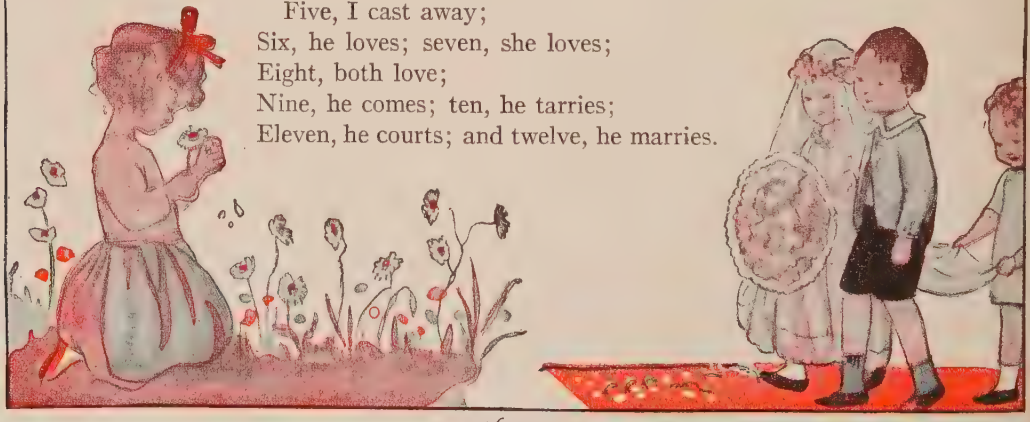
IF the old woman who lived in a shoe
Had lived in a cottage instead,
Her children could have played at hide-and-seek,
And needn't have been sent to bed.

If little Bo-Peep hadn't lost her sheep,
She wouldn't have had to find them,
If Little Boy Blue had not any sheep,
He wouldn't have had to mind them.

If the goose that laid the golden eggs
Had not been killed that day,
She'd still be laying golden eggs
As hard as she could lay.

In fact, if we could manage things,
How different they would be!
But as we can't, we'll let them stay
Just as they are, you see.

ONE, I love; two, I love;
Three, I love, I say;
Four, I love with all my heart;
Five, I cast away;
Six, he loves; seven, she loves;
Eight, both love;
Nine, he comes; ten, he tarries;
Eleven, he courts; and twelve, he marries.

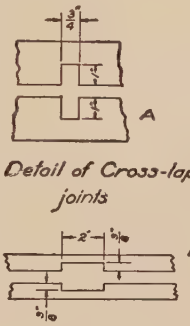


HOW TO MAKE AN ATTRACTIVE PLANT STAND

CONTINUED FROM 2518

EITHER one of the small octagonal stands shown in the accompanying working drawings will prove highly satisfactory for holding potted plants. Two attractive designs are shown in order that you may choose between one which has cross-lap joints and one which has only simple butt joints. Although the making of cross-lap joints is a little more difficult for the amateur, either one of these low stands is easily constructed. For this reason it is more important that you choose the design which seems to be suitable for the surroundings where it will be used.

If possible, the choice of the wood and the finish should also be determined by the other furniture in the room where this piece is to be located. If the room is furnished with oak furniture, white or red oak might well be used, although chestnut can be substituted because it is softer and also nicely grained. In case either mahogany or walnut furniture is used, and this wood is not available, it is always possible to select a fine-grained wood such as poplar or red gum which may be stained to match the wood in question.



Detail of Cross-lap joints

How the joints are made.

These plant stands are made of ¾-inch stock, with the exception of the tops, which may be of either ¾-inch or 1-inch stock. The stand shown in picture 1 requires for its construction stock cut and planed to the following sizes:

4 pieces ¾″ x 3″ x 1′ 6″ for the legs
4 pieces ¾″ x 2″ x 10″ for the cross-rails
1 piece ¾″ or 1″ x 1′ x 1′ for the top

The stand shown in picture 2 requires for its construction stock finished to the following sizes:

4 pieces ¾″ x 4½″ x 1′ 8″ for the legs
2 pieces ¾″ x 10½″ x 10½″ for the leg supports
1 piece ¾″ x 1′ 3″ x 1′ 3″ for the top

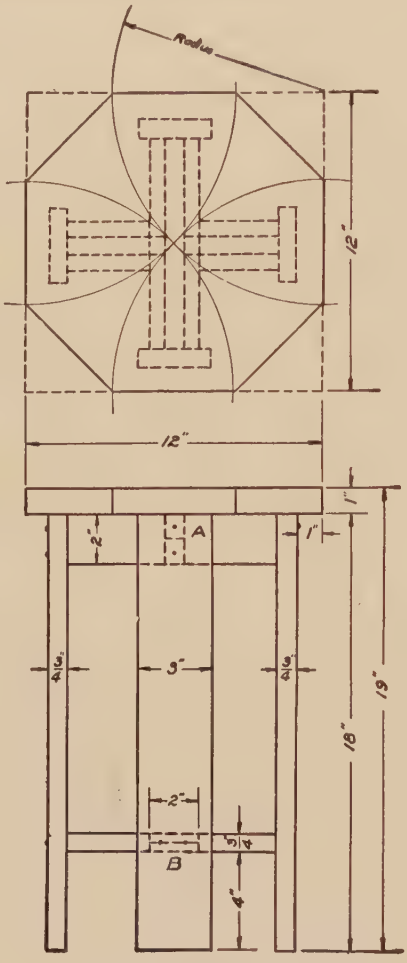
In constructing the plant stand according to the specifications shown in picture 1, it is first necessary to lay out, saw and plane the several parts to the dimensions indicated in the working drawings. Care must be taken in making the surfaces straight and the ends square.

It is suggested that the legs be made first. As the board is already of the proper thickness, ¾ inch, and over 1 foot 6 inches long, plane a working edge square with one surface or face, and mark it. From this working edge gauge 3 inches by marking all around the stock. Now saw the board lengthwise, cutting just outside of the gauged line. This allows enough for planing to remove the stock outside of the line. The ends are next squared and cut to size. Three other legs are also finished in this same manner.

The four cross-rails are each shaped by this same method to a width of 2 inches and a length of 10 inches. As shown in the detailed drawings, *A* and *B*, the cross-lap joints are made by first laying out lines to represent the thickness (see *A*) or the width (see *B*) of the stock in the middle of each cross-rail and then sawing to the required depth on the inside of these lines. It will be noted that the amount chiseled out in either case is just one-half of the actual depth of the cross-rails (see how these cross-members become flush and form the cross-lap joints at *A* and *B* in the assembled drawing).

The thickness of the top may be either ¾ inch or 1 inch, although the latter is given preference, as indicated in the drawing. After planing the working edge, mark the length 12 inches and plane the end. Next mark the width 12 inches and plane the opposite edge. Then plane the other end. As the top is to be made octagonal rather than square, it is next necessary to determine just how much of each corner is to be cut off. This is easily done by first drawing diagonal lines and noting their point of intersection to find the centre of this square piece. Then take as a radius for the scriber the distance from one corner to the point where these lines intersect. As shown in the top view of picture 1, this arc is scribed from each corner to both edges. These points are then connected.

After sawing just outside the lines these four new edges are carefully planed with,



1. A dainty stand.

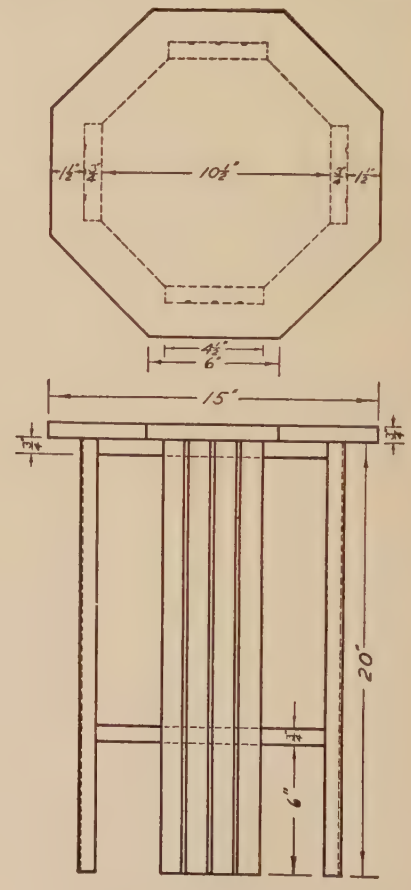
rather than against, the grain to the lines, as indicated. Now sandpaper the entire top, rubbing with the grain of the wood.

After the parts of this plant stand are completely shaped they are ready to be assembled. The cross-rails should first be assembled and fastened together securely with screws, and possibly glue, at the cross-lap joints. Two flat-headed screws of the necessary size should be used for each joint. As it is desirable in each case to have the stem of the screw pass freely through the first piece in order that the head of the screw may hold the two pieces of wood firmly when the screw is driven, it will be found advisable to bore holes either with the gimlet-bit (No. 6) or the drill (⅛") used in a brace. Each hole should also be countersunk to receive the head of the screw, which needs to be flush with the surface of the stock.

The legs may be fastened to the cross-rails as shown, either with ⅜-inch dowels or with round-headed blued-steel screws of the proper size. In either case the suggestions given for similar construction in earlier articles should be carefully observed. It should be noted that the top cross-rails and the legs must be flush in order that the top of the stand may rest even on all surfaces. The lower cross-rails should be located 4 inches from the bottom of all four rails, as specified in picture 1.

The top is fastened to the frame with small angle irons (screws may be used if these are not at hand). First place the top of the stand on the work bench or the floor with its right side down. It will be found convenient to locate the position of the frame by drawing lines on this side of the top 1 inch from the four edges where the legs are to be placed. Then place the inverted frame in its correct position on the top within these lines, and drive ½-inch screws through the angle irons into the sides of the cross-rails and into the top of the stand.

Although somewhat easier for the amateur to make, the construction of the plant stand shown in picture 2 differs from that of picture 1 mainly in the substitution of solid octagonal pieces for cross-rails and in its more massive and decorative legs. Each leg is first laid out and shaped to a width of 4½ inches and a length of 1 foot 8 inches by the same methods



Grooves in legs: ¼" wide, ⅛" deep

2. A more solid stand.

described for making the stand legs in picture 1. However, because the surfaces of the four legs are considerably larger for this stand, the use of rabbets, or grooves cut lengthwise, is suggested to break any monotony in the appearance of the legs by means of light and shadow effects. As shown in picture 2, three of these rabbets are made in the outside surface of each leg. These grooves, which are ¼ inch wide and ⅛ inch deep, can be made by using a special rabbeting plane or by laying out with a marking gauge and chiseling to the desired depth. The exact location or spacing of these grooves is left to your judgment.

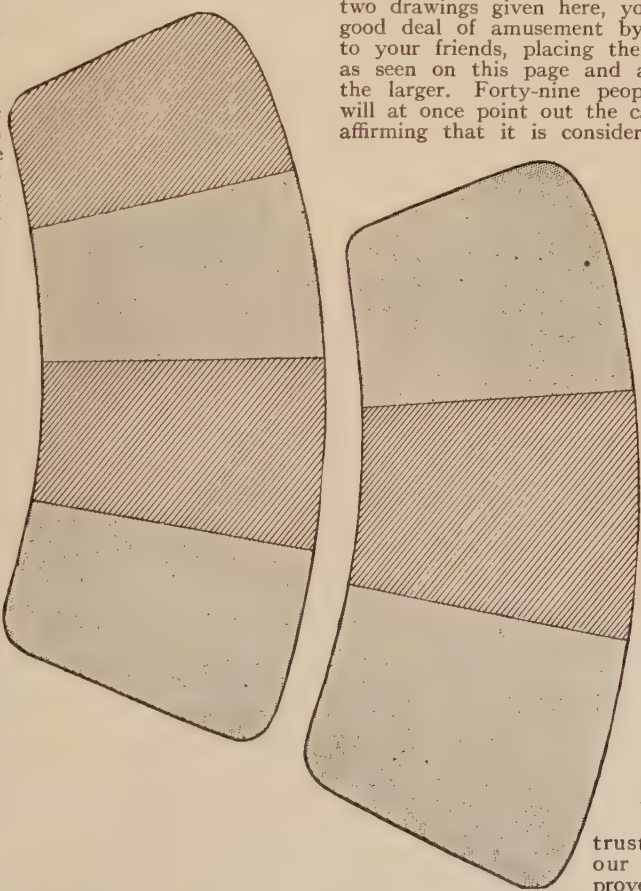
In constructing this plant stand the two solid octagonal pieces to which the legs are fastened, as well as the top, are made in the same manner as has been explained for making the top in picture 1. All three of these pieces can be made of ¾-inch stock, or 1-inch stock may be used for the top. Each of the two octagonal pieces used to brace the legs is made from a piece 10½ inches square, while the top is made from a piece 1 foot 3 inches square.

When the seven necessary parts have been shaped it will be found easier to begin assembling by first fastening the upper leg support to the top with several flat-headed screws. As these screws are put in from the inside, it would be found somewhat difficult to drive them through the support into the top after the frame had been assembled. Before screwing this piece to the top, however, care should be taken to have the grain of these two pieces run at right angles because of the advantages in preventing the top from warping. The correct method of preparing for and driving these screws is explained in the directions for making the plant stand shown in picture 1.

The method of fastening the legs has also been explained. In the working drawing for this stand the distance of the bottom leg support is given as 6 inches, although this dimension may be varied if desired.

PUZZLING CARDS: WHICH IS THE LARGER?

AN old proverb says that things are not always what they seem, and this is something everybody finds out for himself sooner or later. Especially in regard to the size of things our eyes are prone to deceive us, and are particularly untrustworthy when we ask them to give us details. Ask any friend to point to a spot on the wall of the room or upon the door that would indicate the height that a silk hat would be if it were placed upon the floor. It is almost certain that your friend will touch a spot very much higher than the real spot. Probably he will indicate a point about twice as high as the hat will actually reach when it is placed on the floor. There are many other ways by which we can prove how deceptive are our eyes. Here we have an interesting proof of the tricks that our eyes play us. If you trace on card and then cut out with scissors the two drawings given here, you can derive a good deal of amusement by showing them to your friends, placing them side by side as seen on this page and asking which is the larger. Forty-nine people out of fifty will at once point out the card on the left, affirming that it is considerably the larger of the two. You may then ask your mistaken friend to say if he can tell by how much it is larger than the smaller one, and he will probably say that it is about one-fourth or one-fifth larger than the other. As a matter of fact, both pieces are exactly the same size. There are two things that assist each other in deceiving our eyes; one is the shape and position of the two pieces side by side, and the other thing is the markings on the two. There are many other devices by which the untrustworthiness of our eyes may be proved and we shall see some of them on page 2746, but none of them is more striking than the one given here.



THERMOMETERS

HAVE you ever seen temperature expressed in Centigrade degrees and wondered how many degrees Fahrenheit that meant?

Thermometers, you know, are simply instruments for measuring temperature. Most of them are made of a glass tube containing clear mercury. When heat is applied to solids, liquids or gases they become larger; and when the heat is removed they become smaller again. If the glass and mercury both increased alike when a certain amount of heat is applied, then the liquid would not rise in the tube. But since mercury swells seven times as much as the glass does, the liquid expands and rises in the tube when it is warmed. When cooled it contracts and sinks down again.

To find the freezing-point the tube is placed in melting ice, and the spot in the tube where the mercury becomes stationary is noted and a mark made in the stem at that point. The boiling-point is then found by putting the bulb and stem in the steam rising from boiling water, and the place at which the mercury stops is marked. The spaces between these two points, and below the freezing-point, are then divided up and marked.

Fahrenheit Thermometer. There are several kinds of thermometers in use in the world to-day. The one we know best is called the Fahrenheit. This was made about two hundred years ago in Holland by a man named Gabriel Daniel Fahrenheit. Here the freezing-point is marked 32 and the boiling-point 212. He took the temperature of a mixture of ice and salt and marked it 0. You see it is possible to have water several degrees below the freezing-point without actually making ice. Fahrenheit found that as soon as ice began to form, the temperature always rose to the same point and that a mixture of ice and snow with pure water always gave the same temperature. The top point in his scale indicates the boiling-point. Between the two fixed points, which are 32° and 212°, there is an interval of 180 degrees. Fahrenheit's scale with its zero below the freezing-point is used in England, Canada, the United States and other countries where English is spoken.

Centigrade Thermometer. Another thermometer, called the Centigrade, is used in many parts of Europe, and by scientists all over the world. It is very popular, as it is easy to use. The Centigrade scale, as its name indicates, is divided into 100 degrees. The word comes from the Latin *centum*, "hundred," and *gradus*, "degree." In this thermometer the freezing-point is marked 0 and the boiling-point 100.

The difference between the freezing-point and the boiling-point of water is 100 degrees on the Centigrade thermometer and 180 degrees on the Fahrenheit scale. Therefore 5 degrees Centigrade is equivalent to 9 degrees Fahrenheit and 1 degree Centigrade equals 9-5 of 1 degree Fahrenheit. If a Fahrenheit thermometer reads 70° the actual temperature is really 70—32, or 38° Fahrenheit above the freezing-point; but 38° Fahrenheit equals 9-5 of the corresponding Centigrade reading, which is 21 1-9° Centigrade.

So you see there is a very simple way to change a given number of degrees Fahrenheit into Centigrade, as follows: subtract 32 from the number, multiply the result by 5, and then divide by 9. For instance, if you know that the Fahrenheit thermometer reads 104°, and you wish to find how many degrees Centigrade is expressed, first subtract 32 from 104, which gives 72. Then multiply that result, 72, by 5, which gives 360, and divide by 9, which gives 40°, which is the equivalent Centigrade reading.

To reverse the process and change degrees Centigrade into degrees Fahrenheit, multiply by 9, divide by 5, and add 32. For example, how many degrees Fahrenheit is equivalent to 100° Centigrade? To find the answer, first multiply 100 by 9, which gives 900, divide by 5, which gives 180, and add 32 which gives 212°.

Each degree of the Centigrade scale equals 1.8 degrees Fahrenheit, as the Centigrade 0 is at the freezing-point, or 32° Fahrenheit. Five degrees Centigrade are equivalent to 9 degrees Fahrenheit, or 41° on the Fahrenheit scale, and the point marked 10° on the Centigrade scale corresponds to the point marked 50° on the Fahrenheit scale.

The rule which you follow in changing degrees of one thermometer to those of the other may be expressed in this way:

$$F = C \times 9/5 + 32$$

or

$$C = 5/9\ (F - 32).$$

Reaumur. The Reaumur thermometer is another kind which is different from both the Centigrade and Fahrenheit. It was made by a Frenchman in 1730, and is used in Spain and some parts of Germany. In Reaumur's thermometer the space between the freezing-point and the boiling-point of water is divided into 80 equal parts, and 0 is placed at the freezing-point. To change a certain number of degrees Fahrenheit into Reaumur, first subtract 32 from the number, then multiply the result by 4, and divide by 9. For instance, you may wish to change 104° Fahrenheit into Reaumur by this method. If so, first subtract 32 from 104, leaving 72, then multiply 72 by 4 and you will have 288. Divide this by 9 and you will have 32° Reaumur. So that 32° Reaumur is equal to 40° Centigrade and 104° Fahrenheit.

To change Reaumur into Fahrenheit, multiply by 9, divide by 4, and add 32. For example, to find what 80° Reaumur equals in the Fahrenheit scale, follow this method. First multiply 80 by 9, which gives 720, divide this by 4, which gives 180, and add 32 and you will have 212°. The formula which you use may be expressed in the following way:

$$F = R \times 9/4 + 32.$$

Alcohol Thermometer. As the mercury in the tube will freeze at about 40° below the zero point in the Fahrenheit thermometer, alcohol colored red, or even ether, is used in the thermometers in very cold places. This kind of thermometer marks degrees as low as 100° below 0. The alcohol thermometer

cannot be used for temperatures above its boiling-point, which is 80° Centigrade.

Temperature. The ideal room, or indoor, temperature is about 68° to 70° Fahrenheit, with about 50 per cent of humidity or moisture. If the temperature of the room drops toward 60° Fahrenheit, the probability is that we have already taken cold before we notice the change. If the temperature in an artificially heated room rises toward 76° or 78° Fahrenheit, the air we breathe is vitiated, contaminated and rendered unhealthful, and becomes a breeding-place for bacteria.

The normal temperature of the human body in health is usually 98.6° Fahrenheit. In summer and winter, regardless of the changes of the surrounding atmospheric temperature, the temperature of healthy persons seldom varies more than one degree of temperature. A greater change means something is wrong.

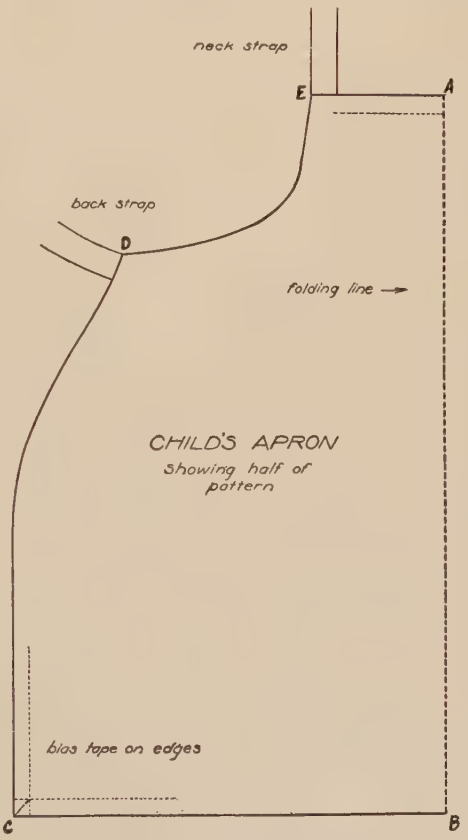
A CHILD'S APRON EASILY MADE

NEARLY every little boy or girl needs an apron to protect the clothing in work and play. You can see that the convenient apron shown in the accompanying drawing is quite simply and easily made. This apron may be made from a piece of gingham, percale or pretty cretonne. Small children usually prefer aprons which are made from cretonne with nursery pictures on it. So, if you wish to delight little brother or sister, select material with pictures of rabbits or other animals on it, although any piece of material which you may have will answer the purpose for which the apron is intended.

In making this apron for a child about five years of age, ¾ yard of material is enough. You may add to, or decrease, this to suit the size of the child for whom it is being made. First it is well to make a paper pattern so that the apron will be sure to fit when it has been cut from the cloth. This is done by marking off 18 inches on a large piece of wrapping-paper which has been folded as shown by the dotted line *AB* in the drawing. As only one-half of the pattern is laid out from this line, you should next mark off at right angles 11 inches from *B* to *C* and 3¾ inches from *A* to *E*. Then draw a line from *C* to *D*, curving the upper half of it enough to make it fit the child's waist. From *E* draw a deep curve to *D* as shown. You try the apron pattern on the child to see if these curves fit before you cut out the pattern.

When it fits to your satisfaction, lay your pattern lengthwise on the folded material and pin it before you cut the cloth around the apron pattern. With a piece of bias tape baste all the way around the edges of the cloth by putting the wrong side of the tape to the wrong side of the material. (Care should be taken when you come to a corner, as it is necessary to leave the tape somewhat full rather than to pull it up tight.) The tape may be sewed by machine or by hand, but it is then turned to the right side, basted there, and sewed in place. To make a really neat corner the bias tape should be mitred as shown. This is done by folding the tape diagonally or having one piece under and the other over.

The apron is held in place by neck- and back-straps, which are easily made by folding pieces of cloth of the desired lengths and sewing them on the wrong side. These are later turned to the right side, however. The neck strap can be made from a piece of cloth about 2 inches wide and 15 inches long. Either end of this is sewed as shown at *E*. The back-strap can be made from two pieces about 2 inches wide and 8 inches long, if these are to be tied, or it can be made from only one piece of this size, if it is to be buttoned. In the latter case, it should be sewed to only one side at *D*, as a buttonhole will be needed in the other end of the strap for the button which is sewed on the opposite side corresponding to *D*.



Pattern for a child's apron.

This apron is all ready for little brother or sister to enjoy in play or in work. If a larger one is desired by an older child, this pattern is easily enlarged.

A CHRISTMAS CHARADE

HERE is a pretty little charade that can be entirely acted by children. It would make a charming entertainment for Christmas Eve, and would not only interest young people, but would be amusing to everybody in the audience. The word that is to be guessed is, of course, hidden in the scenes of the little play.

The charade can be acted in a drawing-room without much preparation. All you will have to do is to move the necessary furniture to one end of the room, and then place a lot of chairs at the other end for the audience.

If possible, try to arrange things so that the part of the room that will be your stage is close to the door. Then the actors will be able to make their entrances and exits nicely. If this cannot be done, a screen should be put up, and the performers must remain behind this when they are not acting.

FIRST SCENE

A room. At a table Princess Myra is sitting knitting. As she knits she sings:

A Princess sat in a castle grim,
And weary at heart was she,
And her eyes were dim as she thought of him—
A soldier brave
Far across the wave,
A soldier of low degree.

She stops singing and rises from her chair. For a moment she stands listening. Then the door opens, and a young man rushes in and kneels before her.

PRINCESS: Why are you here? You must go! You must go!

BRIAN: I have come so far to see you, Princess. Do not send me away.

PRINCESS: You are in danger here. If my father found you he would have you imprisoned.

BRIAN: Princess, I love you! I have traveled a thousand miles to see you. I cannot go.

PRINCESS: You must! You are in danger!

BRIAN: I am a soldier!

PRINCESS: For my sake you must go.

She places her hands on his shoulders and looks into his face.

BRIAN: You do not love me then?

The Princess turns away and takes up her knitting. She hides her face. For a moment he watches her; then he leans over her shoulder to see at what she has been working.

BRIAN: What are you making, Princess?

PRINCESS: It is but a little thing—a knitted mat of silken threads, such as we ladies make to pass the days. It was for you—see, it is nearly finished.

BRIAN: It is of red silk. Red is for love!

PRINCESS: And 'tis a soldier's color.

He kisses her. She starts as she hears somebody coming.

PRINCESS: Go! You must go! To-night I will send a letter to you. But now you must leave me.

He kisses her once more and then leaves the room. She leans over the table and covers her face.

SECOND SCENE

Brian is sitting by a bare table, on which is a lighted candle. He is reading a letter. His sword lies in front of him.

BRIAN (*reading aloud*): "I love you, Brian. But if my father knew he would send me far away, and I dare not think of what would happen. Brian, I am a Princess; they say I must marry a Prince, who some day will be a king, like my father. I have given my heart to you, but you must be worthy of it. Go! take your sword and win fame. Come back when you have won a soldier's honor, and then, maybe, my father will ennoble you, and some day consent to our marriage."

For a few moments he sits twisting the letter in his hands. Then he kisses it, and puts it into his pocket.

BRIAN: I must win a soldier's honors. Ah, well, I can but try! It is her wish; and if I lose my life, it is well lost. I must try! I must try!

Taking up his sword he leaves the room.

THIRD SCENE

A room. The Queen, Princess Myra's mother, is standing. Princess Myra is kneeling on the floor before her.

QUEEN: My daughter, for three long years you have shut yourself in this small room. Your eyes have grown red with weeping. Many princely suitors have asked your royal father for your hand, but to all you have refused to listen. This must not be, my child. The time has come when thou must marry one of proper rank.

PRINCESS: Mother, I cannot! I have vowed to marry no one unless he be of my own choice.

QUEEN: This is madness! The Prince we have chosen for you is young, handsome and brave, a soldier who has risen to save our country and our throne. For his deeds your father has raised him to royal rank.

PRINCESS: But, mother, I cannot marry one I do not love.

QUEEN: None could help loving so brave a soldier. And his wealth is equal to his bravery.

PRINCESS: I care not for his money. I will not see him.

QUEEN: You shall see him, for he comes now.

Brian enters. He stands watching them for a moment. The Princess is still kneeling before her mother. Suddenly she looks up and sees him.

PRINCESS: Brian! You have come back at last.

She jumps up, runs to him, and throws her arms around him.

BRIAN: At last! Say I am not too late, Princess; say I have not come too late.

PRINCESS: I would have waited for my soldier all my life. I care not if you are poor. I will marry you, and no Prince!

QUEEN: But, child, this is the Prince!

BRIAN: Yes, Princess, I am the Prince of whom the Queen spoke. You sent me away to win fame and fortune with my sword. I have won a soldier's honors, and a fortune that——

PRINCESS: I did not send you away because you were poor, Brian.

BRIAN: 'Twas your father who made me rich that I might have sufficient for our state. Honor and wealth are ours, Princess, and now——

She kisses him, and speaks very softly.

PRINCESS: My Prince!

The hidden syllable in the first scene is *mat;* in the second, *try;* in the third, *money.*

The complete word that the audience have to guess is, therefore, *matrimony.*

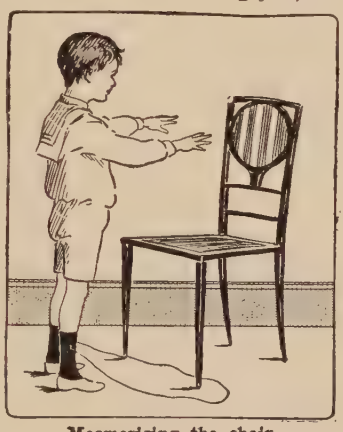
The Princess should wear a long white dress reaching to her feet. Her hair should be bound with golden bands made out of gilt braid, and around her waist she should wear a golden girdle made of the same braid. The soldier's uniform can be made out of a pair of blue serge trousers and an Eton jacket. A strip of the gold braid must be sewn down each leg of the trousers, and the Eton jacket must be worn with the lapels turned over and pinned across the chest. It should be covered with the material which is called "Turkey Red," and some gold braid should be sewn on the front. A helmet with brass chin-strap can be bought at a toy shop for a quarter. The sword and belt could be made with wood and silver paper, but the toy shop ones sold for a quarter look neater.

The Queen should have a dark dress of velvet. From her shoulders should hang a long train of some dark crimson cloth, and cotton batting should be sewn around the edge to look like ermine. A crown can be made out of cardboard covered with gilt paper. Beads and pearl buttons can be used for jewels.

THE CHAIR THAT COMES TO YOU

ALMOST everybody has heard of mesmerism. If any boy who reads this page has not done so, it may be explained that it means a curious power possessed by some people of making other people obey their commands, even though it be to do something silly or ridiculous.

Such a power as that you are much better without; but you may learn here how to do something which seems to be even more surprising—namely, how to mesmerize a chair and make it follow you about the room. You seem merely to place yourself in front of it, and wave your hands over it a few times with the same sort of movement that you make in swimming. When you consider the chair sufficiently "mesmerized," you walk backward, as in the picture, beckoning it to come to you; and it follows you accordingly. At any moment anyone may pick it up and examine it, but he will find nothing to account for its curious behavior.



Mesmerizing the chair.

Of course, there is a trick about the matter, and, like many of the best tricks, it is absurdly simple when you know it. It all depends upon a piece of strong black silk thread, not attached to the chair in any way, but arranged in a very ingenious manner.

To prepare for the trick, take the thread, which should be about 4 feet long, and tie to each end of it a black pin bent into the form of a hook. You then hook one pin into the front of each stocking, if you are wearing knickers, just above the shoe. If you wear trousers, the pins must be hooked into the front of each trouser-leg. The rest of the thread will lie on the carpet between your feet, and when you step backward, will form a sort of broad loop in front of you. By gaslight it will be invisible at a few feet distance, and if you are careful it will not interfere in the least with your moving about. The chair used must be of the very light drawing-room kind, and the more upright the legs are, the better. If there is more than one such chair in the room, you should let the company decide which of them you shall use.

The choice having been made, you hold the chair upside down, and move it about freely, so as to let people see for themselves that there is nothing attached to it in any way. You then make a step backward, and set it down facing you, but with one of its legs inside the loop formed by the thread, and begin to make your "mesmeric" passes as already described. You must be very serious over this. After a minute or so you say: "I should think it is now under the mesmeric influence. Chair, come to me!" At first nothing happens, so you mesmerize it a little more, and presently again say: "Chair, it is useless to resist my will. I command you! Come!"

As you say this you make a beckoning movement, and at the same time begin to move very slowly backward. The drawing back of the foot tightens the thread, and this draws the chair with it.

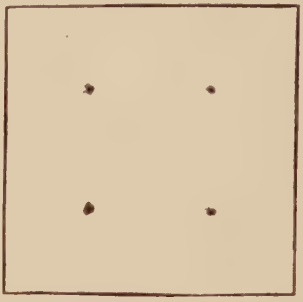
You should not keep this up too long. When the chair has moved a foot or so, it is best—though still beckoning—to let it come to a standstill. Then you say: "I can't make it come any further. The power is exhausted—or something to that effect. You then again pick up the chair, free of the thread, and offer it to anybody who cares to examine it.

Simple though it is, this is a trick which requires a good deal of practice before it is performed in public. Not only do you thereby gain confidence, but in the course of your practice you will find out exactly what length of thread suits you best, and the most natural way of drawing back so as to compel the chair to follow you without giving away the secret.

French chalk rubbed on each leg of the chair will make it slide easily over the carpet.

THE MYSTERIOUS PAPER PURSE

THE young conjurer borrows a dime. Taking a piece of paper about 4 inches square, he lays this on the table, puts the coin in the centre, and folds down the sides over it. There is "no deception" so far; the coin is honestly wrapped in the paper. Picking up the little packet, he asks someone to blow upon it, or does so himself. When he again opens the paper the dime has disappeared, and the owner probably begins to wish he had not lent it. But again the young wizard folds the paper. Once more he blows upon it, and once more unfolds it. The dime has come back, and the owner of the coin looks quite cheerful again.



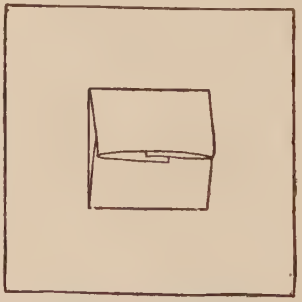
1. Paper marked for folding.

We hear it said of a boy sometimes, that he "is not such a fool as he looks," and the same sort of remark might fairly be made about our simple-looking bit of paper. It is not quite so simple as it appears to be; in fact, it is a "trick" paper, specially arranged for the purpose of this feat. The young conjurer may find some amusement in preparing such a paper for himself. To do so, he should proceed as follows:

Take a half-sheet of ordinary notepaper and fold it in two. Then, with a sharp needle make four little holes through both thicknesses of the paper, 2 inches apart, so as to form a square, as shown in picture 1. Then cut apart the two portions of the paper, and fold down the edges of one of them toward the centre, using the needle-marks as guides. The paper thus folded will form a sort of little pocket, or envelope, as in picture 2. Paste or glue this in the centre of the other paper, exactly between the needle-marks. The two together will now look on the one side like our third picture, but on the other side like a plain piece of paper.

2. The folded paper purse.

This last is the side which, in performing the trick, you show to the company, taking care, by the way, not to show it with a light behind it, which would give away the secret. You then lay the paper, with this side uppermost, on the table. Having placed the coin on the paper, you fold down the edges over it, again using the needle-marks as guides, so as to make the folding correspond exactly with that of the pocket on the other side. The paper will now in reality form two such little pockets, back to back, but if you have done your work neatly, no one will notice that such is the case. In the act of offering the paper to be blown upon, you turn it over so that when you again open it, it is the empty side that you open. When it is blown upon for the second time, you again turn it over so as to bring the side in which you placed the dime uppermost.



3. The back of the paper as prepared for use.

You must, of course, not let the company perceive that you reverse the paper. To do this in proper conjuring style, you should hold it, in the first instance, clipped between the first and second fingers of the right hand. As you offer it to be blown upon, you must push it upward with the thumb and clip its outer edge between the thumb and forefinger, when it will have performed an imperceptible somersault. The turn-over should be made with the arm in motion, when the greater movement will conceal the less important from the spectators.

The dime is brought back again by a repetition of the process. Of course, you are not bound to use a dime. Any piece of money, or a bone counter, may be substituted, according to the effect you desire to produce. Further, you may use the paper not only to "vanish," but to change one thing into another. For instance, in order to change a dime into a nickel, you have only to place a nickel beforehand in the pocket on the reverse side of the paper.

You may use the same paper more than once if you please, but it will in such case show by the creases that it has been previously folded, and the effect is scarcely so good as with a freshly prepared piece of paper.

The method above described is the simplest form of the trick. You may improve it considerably by using three pieces of paper instead of one. One of these must be rather smaller, and the other larger, than the trick paper. The smallest one we shall call No. 1, the trick paper No. 2, and the largest paper No. 3. The first and last are mere plain pieces of paper, but you must have an exact duplicate of No. 1, and place this beforehand, properly folded, in the pocket of No. 2. When you work the trick in this manner you should, in a careless sort of way, show both sides of No. 1 before wrapping the coin in it. This done, you place this paper, with the coin in it, in No. 2, and then this latter in No. 3, first, however, turning it over as described. The trick is now done. When you come to No. 2, it is the empty duplicate of No. 1 that you find therein. This you should hand to someone else to open. Nos. 1 and 3, being obviously mere ordinary bits of paper, no one will suspect that No. 2 is a fraud. You can find many variations of this trick.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 2739.